

SAPOTACEAE OF PANAMA¹

GEORGE E. PILZ²

ABSTRACT

The *Flora of Panama* Sapotaceae treatment by Blackwell is updated. *Pouteria congestifolia* Pilz and *P. leptopedicellata* Pilz are newly described and the combination *Pouteria buenaventurensis* (Aubr.) Pilz is made. As now revised, the Panamanian flora includes 44 species in 11 genera, an increase from the 24 species in 6 genera known to Blackwell. This revision is based on collections made in the past decade.

Trees or shrubs with milky latex. *Leaves* alternate, rarely opposite; nodes mostly trilacunar, the traces evident on the leaf scar; blades simple, entire; pubescence of 2-armed hairs, one arm sometimes obsolete. *Flowers* solitary or clustered in axils or at recently defoliated nodes, rarely cauliflorous, perfect, rarely unisexual, actinomorphic; sepals in one or two whorls, rarely spiral, free or rarely united; corolla gamopetalous, the lobes simple or divided, usually as many as sepals; stamens generally as many as the corolla lobes and opposite them, the staminodes sometimes present between the corolla lobes, variously developed; pistil syncarpous, the style simple, sometimes obscurely lobed at the summit, the ovary superior, 1–14-loculed, the carpels uniovulate. *Fruit* a berry; exocarp usually fleshy, often becoming sclerotic; seeds 1–several, the testa hard, smooth, often shiny, the attachment area (scar) lateral or basal, variously developed, often rough and duller in color, the endosperm either copious on either side of the flat foliaceous cotyledons, or scanty, or absent with thick fleshy cotyledons.

Scarcely 12 years have elapsed since Blackwell (1968) published the treatment of Sapotaceae for the *Flora of Panama*. Blackwell treated 24 species in 6 genera, while the present study treats 44 species in 11 genera. Recent collections, particularly from moist forest areas, have significantly increased the number of taxa known from Panama, and they have also permitted the first descriptions of flowers and/or fruits for several species. Still, all too many species have inadequate series of specimens, and collectors can greatly assist future monographers by seeking flowers and fruits of all but the most common cultivated species. Determination of geographical distribution and morphological variation of most species awaits further collection of specimens.

Collectors can also make valuable contributions by preserving viable seeds and/or developing flowers for cytological study. Sapotaceae are almost completely unknown cytologically, particularly American species. Patterns seen in a few chromosome counts that have been made of Old World taxa look interesting, and a more complete record might prove valuable in determining the natural affinities of certain species.

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² The Polytechnic, Department of Biology, Ibadan, Nigeria.

Full descriptions are included in this treatment only for those taxa not treated by Blackwell (1968). Likewise, complete lists of synonyms are not included. The nomenclature used for American Sapotaceae has been in considerable flux, and it is by no means stabilized even now. Over 200 names have been proposed for the 44 species treated in this study. Nearly half of the later synonyms are nomenclatural, reflecting the widely different concept of genera held by various authorities. More complete lists of synonyms may be found in papers cited after the generic descriptions.

As a taxonomic result of this study I am describing two new species of *Pouteria* and transferring *Richardella buenaventurensis* to *Pouteria*.

Literature:

- Aubréville, A. 1965. Sapotacées. *Adansonia*, mém. 1: 1–157.
 ———. 1972. Sapotaceae. *In* The botany of the Guayana Highland, Part IX. Mem. New York Bot. Gard. 23: 199–227.
 Baehni, C. 1965. Mémoires sur les Sapotacées. Inventaire des genres. *Boissiera* 11: 1–262.
 Blackwell, W. H. 1968. Sapotaceae. *In* Flora of Panama. Ann. Missouri Bot. Gard. 55: 145–169.
 Standley, P. C. & L. O. Williams. 1967. Sapotaceae. *In* Flora of Guatemala. Fieldiana, Bot. 24(3): 211–244.

- a. Calyx biseriate, with two distinct series of 3/3 or 4/4 persistent sepals.
 b. Calyx of 3/3 sepals; fertile stamens 6; seed scar basilateral and several times longer than broad 5. *Manilkara*
 bb. Calyx of 4/4 sepals; fertile stamens 8; seed scar nearly basal and suborbicular 8. *Mimusops*
 aa. Calyx with a single cycle or series of sepals, if distinctly biseriate then 2/2.
 c. Flowers with well-developed staminodes.
 d. Seed scar small, basal or basilateral, never reaching the middle of the seed; stamens inserted at top of the throat in the sinuses between the corolla lobes; corolla lobes with lateral appendages or without appendages.
 e. Corolla lobes with lateral appendages; petiole 0.2–2 cm long.
 f. Seed with endosperm; plants unarmed; ovary usually glabrous; style 1.2–2 mm long; apex of the fruit tapering to a persistent style 3. *Dipholis*
 ff. Seed without endosperm; plants often with spines; ovary usually pubescent; style 3–7 mm long; apex of the fruit rounded or truncate 1. *Bumelia*
 ee. Corolla lobes without appendages; petioles 3–9 cm long, usually $\frac{1}{2}$ the length of the blade or more 6. *Mastichodendron*
 dd. Seed scar lateral, usually extending past the middle of the seed; stamen insertion various; corolla without dorsal or lateral appendages.
 g. Leaves striate, the lateral veins usually less than 1 mm apart; seeds with some endosperm 7. *Micropholis*
 gg. Leaves with 8–20(–50) lateral veins, usually 4 mm or more apart; seed without endosperm.
 h. Sepals united for $\frac{1}{2}$ their length or more 11. *Synsepalum*
 hh. Sepals essentially free, imbricate or quincuncial 10. *Pouteria*
 cc. Flowers with staminodes irregularly present or rudimentary or lacking.
 i. Seed without endosperm.
 j. Seed scar lateral, linear, 3 mm or less in width; corolla lobes generally as long as the tube.

- k. Ovary 1-3-loculed; leaves often glaucous, the lateral veins 13-18 pairs, weak or obscure beneath 9. *Neoxythece*
- kk. Ovary (4-)5(-6)-loculed; leaves not glaucous, the lateral veins 7-11 pairs, well developed 10. *Pouteria*
- jj. Seed scar lateral, covering ½ of seed, elliptic or oblong, 1 cm or more wide; corolla lobes more than twice as long as the tube 4. *Elaeoluma*
- ii. Seed with endosperm 2. *Chrysophyllum*

1. BUMELIA

Bumelia Swartz, Prodr. Veg. Ind. Occ. 49. 1788, nom. cons. TYPE: *B. retusa* Swartz.

Shrubs or trees usually armed with spines. *Leaves* alternate, exstipulate; blades firm. *Flowers* subsessile to pedicellate; sepals 5, uniseriate; corolla lobes 5, each lobe entire or divided into 3 segments; stamens epipetalous, the filaments attached at the level of the sinuses, the staminodes alternating with the stamens, petaloid, entire to erose or laciniate; ovary 5-loculed. *Fruit* baccate, rounded to retuse at the apex; seeds solitary, the seed scar subbasal, small, scarcely longer than broad, the endosperm absent, the cotyledons fleshy.

Bumelia is a genus of about 25 species found in tropical and warm America.

Literature:

Cronquist, A. 1945. Studies in the Sapotaceae, III. *Dipholis* and *Bumelia*. J. Arnold Arbor. 26: 435-471 (*Bumelia*, 445-471).

1. ***Bumelia persimilis*** Hemsley subsp. ***persimilis***, Biol. Centr.-Amer., Bot. 2: 298. 1882. TYPE: Mexico, Vera Cruz, Orizaba, *Botteri* 989 (F, US, isotypes).

Shrub or tree to 18 m. *Leaves* 3-12 cm long, 1-5 cm wide, usually elliptic, acute to obtuse; primary lateral veins 10-30 pairs; petiole 2-10 mm. *Flowers* several to numerous in the axils; pedicels 3-6 mm long; sepals (4-)5(-6), 1.8-3.7 mm long; corolla 4.5-6 mm long, the lobes 5, twice as long as the tube; filaments attached at the level of the sinuses; ovary 5-loculed. *Fruit* fleshy, smooth, 1.2-2.5 cm long, 1-2 cm wide, 1-seeded; seed scar small, subbasal (Blackwell, 1968).

This variety ranges from Mexico through Central America to Venezuela.

COCLÉ: El Valle de Antón along Río Indio trail, *Hunter & Allen* 298 (EAP, F). LOS SANTOS: Los Santos, *Lao* 321 (MO). PANAMÁ: Chepo, *Kluge* 12 (US).

2. CHRYSOPHYLLUM

Chrysophyllum L., Sp. Pl. 192. 1753. TYPE: *C. cainito* L.

Trees or shrubs lacking spines. *Leaves* alternate, exstipulate; blades firm to coriaceous, the secondary lateral veins often parallel to the primary series. *Flowers* pedicellate; sepals 5, uniseriate; corolla lobes 5, lacking appendages; stamens epipetalous, the filaments variously attached from near the base of the corolla tube to the level of the sinuses, the staminodes absent or (rarely in individual flowers) 1 or more irregularly developed in the corolla sinuses; ovary 4-12-loc-

uled. *Fruit* baccate, often edible; seeds 1–several, the seed scar large, lateral or basilateral, variously developed, linear to covering nearly half the seed surface, the endosperm copious, the cotyledons thin and foliaceous.

Chrysophyllum is a pantropical genus of about 80 species.

Literature:

Aubréville, A. 1961. Notes sur les Sapotacées Africaines et Sud-Américaines. *Adansonia*, n.s., 1: 6–38 (*Chrysophyllum*, 9–13).

Cronquist, A. 1945. Studies in the Sapotaceae, I. The North American species of *Chrysophyllum*. *Bull. Torrey Bot. Club* 72: 191–204.

———. 1946. Studies in the Sapotaceae, V. The South American species of *Chrysophyllum*. *Bull. Torrey Bot. Club* 73: 286–311.

- a. Corolla lobes equal to or longer than the tube; sepals to 1 mm long.
 - b. Seed scar lateral, nearly as long as the seed, 4–7 mm wide; stigma lobes mostly 7–12; fruit 4–10-seeded 1. *C. cainito*
 - bb. Seed scar basilateral, nearly as broad as long, not reaching much past middle of the seed or shorter; stigma lobes (4–)5(–6); fruit 1-seeded 4. *C. mexicanum*
- aa. Corolla lobes generally less than half as long as the tube; sepals 1–4 mm long.
 - c. Sepals 1–2 mm long; seed scar basilateral, not reaching much past middle of seed, usually shorter 5. *C. panamense*
 - cc. Sepals 3–4 mm long.
 - d. Staminal filaments attached near the middle of the corolla tube; pedicel to 5 mm long; petiole 1–3 cm long; seed scar lateral, nearly entire length of seed 2. *C. excelsum*
 - dd. Staminal filaments attached to the top of the corolla tube; pedicel 4–20 mm long; petiole 1 cm or less in length; seed scar presumably basilateral, reaching only middle of seed 3. *C. hirsutum*

1. *Chrysophyllum cainito* L., Sp. Pl. 192. 1753.

Tree to 30 m. *Leaves* 10–16 cm long, 5–8 cm wide, elliptic to oblong, short-acuminate; primary lateral veins 10–18 pairs; petioles 1–2.5 cm long. *Flowers* numerous in the axils; pedicels 5–16 mm long; sepals (4–)5(–6), ca. 1 mm long; corolla 3–5 mm long, the lobes (4–)5(–6), as long as the tube or slightly longer; filaments attached at the level of the sinuses; ovary 4–12-loculed. *Fruit* fleshy, subglobose, 3–10 cm broad, 4–10-seeded; seed scar lateral, extending nearly as long as the seed, elliptic, 4–7 mm broad (Blackwell, 1968).

Chrysophyllum cainito ranges over Mexico through Central America to northern South America and from Florida through the West Indies. It is widely cultivated and is probably indigenous only to the West Indies.

BOCAS DEL TORO: Changuinola Valley, *Dunlap 24* (F). Almirante, road to Chiriquí, *McDaniel 5074* (MO). Chiriquí Lagoon, *Wedel 2523* (MO). CANAL ZONE: Ancón Hill, *Allen 2672* (EAP). Madden Dam and along Azote Caballo Road near Alajuela, *Dodge 16573* (MO, UC). Upper Chilibre River, ½–1 mi below Chilibre, *Seibert 1505* (MO). CHIRIQUÍ: E of Gualaca, *Allen 5033* (EAP, MO). Progreso, *Cooper & Slater 247* (F), *264* (F). Burica Peninsula, San Bartolo Limite, 12 mi W of Puerto Armuelles, *Croat 22168* (MO). COCLÉ: Floor of El Valle de Antón, *Allen 2747* (EAP, F). DARIÉN: Río Sabana above Santa Fé, *Duke 14104* (MO). Campamento Buena Vista, Río Chucunaque above confluence with Río Tuquesa, *Stern et al. 853* (MO, UC). HERRERA: Ocú, *Allen 3647* (EAP, MO). LOS SANTOS: Tonosí, *Duke 12488* (MO). PANAMÁ: Panamerican Highway ca. halfway between El Llano and Río Momoní, *Duke 5527* (MO). Chepo, *Kluge 49* (F). Taboga Island, *Woodson et al. 1537* (MO). SAN

BLAS: Mainland opposite Playon Chico, *Gentry 6397* (MO). VERAGUAS: Cerro Tute, region W of Santa Fé, *Allen 4441* (EAP, MO). Coiba Island, *Dwyer 2331* (MO). El Embalsadero, 8 mi W of Santiago, *Tyson 6075* (MO).

2. ***Chrysophyllum excelsum*** Huber, Bol. Mus. Paraense Hist. Nat. 3: 55. 1902.
TYPE: Brazil, specimens collected from a cultivated tree at Pará, *Huber 3016* (G, not seen; F, US, isotypes).

Tree to 30 m. *Leaves* with petioles 1–4 cm long; blades elliptic to elliptic-obovate, thin to firm, rounded to mucronate, 6–30 cm long, 4–12 cm wide, glabrate; primary lateral veins 9–14 pairs, the secondary and tertiary ones forming an evident reticulum. *Flowers* 5–10 at recently defoliated nodes; pedicels 3–5 mm long, strigose; sepals 5, ovate, 3–3.5 mm long, 3–4 mm wide, rufous sericeous-strigose; corolla 3.8–4.3 mm long, the lobes 5, fringed-ciliolate, ca. $\frac{1}{4}$ as long as the tube; filaments attached near the middle of the tube; ovary 5-loculed, the style 0.5–2.5 mm long, glabrous. *Fruit* yellow, globose, 3.5–5 cm thick; seeds 4–5, ovoid, about 25 mm long, 13–14 mm wide, 7 mm thick, the seed scar lateral, as long as the seed, ovate, 2–5 mm broad.

This species occurs in the upper Amazon Basin, Brazil, Venezuela, and Panama.

Leaves of the Panamanian material are generally thicker and smaller than those found on South American plants, but the venation pattern is very similar and otherwise the plants are not distinctive.

PANAMÁ: Near archeological site at edge of Madden Lake, *Gentry & Tyson 5040* (MO).

3. ***Chrysophyllum hirsutum*** Cronquist, Bull. Torrey Bot. Club 72: 198. 1945.
TYPE: Costa Rica, Alajuela, Villa Quesada, San Carlos, edge of forest, *Austin Smith 1776* (A, not seen; F, isotype).

Shrub or tree to 10 m tall. *Leaves* with petioles to 1 cm long; blades generally elliptic, thin, rounded to abruptly acuminate, 6–11 cm long, 2.5–5 cm wide, sparsely rufous-hirsutulose, glabrate; primary lateral veins 10–15 pairs, the secondary and tertiary ones inconspicuous. *Flowers* 2–6 in the axils; pedicels 4–20 mm long, sericeous-strigose; sepals 5, acute to rounded, 2–4 mm long, 1.5–2.5 mm wide, densely rufous pubescent; corolla greenish white, 4.5–7 mm long, rufous pubescent on the back of the lobes and distal portion of the tube, the lobes (4–)5, $\frac{1}{3}$ – $\frac{1}{2}$ as long as tube; filaments to 0.5 mm long, attached at the level of the sinuses; ovary densely rufous pubescent, 5-loculed. *Fruit* little known, but apparently 1-seeded and over 2 cm long.

This species occurs in Costa Rica and Panama.

Chrysophyllum hirsutum is known from moist forest at elevations over 600 m. The pedicels of Panamanian material are two to three times longer than those collected from Costa Rica, but otherwise the plants are not distinctive.

COLÓN: Agua Clara rainfall station, Santa Rita Ridge, *Foster 1739* (MO). Santa Rita Ridge, *Gentry & Dwyer 4800* (MO). PANAMÁ: Cerro Azul, *Lao & Holdridge 34* (MO).

4. **Chrysophyllum mexicanum** Brand. ex Standley, Contr. U.S. Natl. Herb. 23: 1114. 1924. TYPE: Mexico, Veracruz, Zacuapán, *Purpus* 7679 (US, holotype; MO, NY, UC, isotypes).

Shrub or tree to 20 m tall. *Leaves* with petioles 4–10 mm long; blades generally elliptic, thin, acuminate to acute, 5–14 cm long, 2–6 cm wide, rufous to pale pubescent, glabrate; primary lateral veins 9–14(–20) pairs, prominent to very weak, the secondary and tertiary ones weak and often obscure. Flowers 1–15 (–20) in the axils; pedicels 2–5 mm long, pale to rufous pubescent; sepals 5, ovate, ca. 1 mm long, 1 mm wide, rufous or pale pubescent; corolla greenish white, 2–2.5(–3.5) mm long, glabrous, the lobes (4–)5, as long as the tube or slightly longer; filaments 0.1–0.5 mm long, attached near the level of the sinuses; ovary rufous pubescent, 5–6-loculed, the stigma 0.1–0.4 mm long, 5–6-lobed. *Fruit* ellipsoid, 1.5–2 cm long, 1 cm thick, smooth, glabrate; seeds solitary, ovoid, ca. 12 mm long, 7–8 mm thick, the seed scar basilateral, extending to about the middle of the seed, 3–4 mm broad.

This species ranges from Mexico through Central America to Colombia.

Chrysophyllum mexicanum is highly variable as to leaf size, pubescence, and degree of prominence of the lateral veins, but these differences are not sufficiently correlated to justify the recognition of subspecies or varieties.

COCLÉ: El Valle de Antón, *Croat* 25282 (MO); *Lao* 286 (MO). Behind Club Campestre, *Duke* 13266 (MO). DARIÉN: Hills near Pidiaque, *Duke* 8047 (MO). Río Sabana above Santa Fé, *Duke* 14108 (MO).

5. **Chrysophyllum panamense** Pittier, Contr. U.S. Natl. Herb. 18: 165. 1916. TYPE: Panama, *Pittier* 4005 (US, holotype; NY, isotype).

Tree to 15 m. *Leaves* 15–25 cm long, 6–11 cm wide, elliptic to elliptic-obovate, acuminate; primary lateral veins 10–20 pairs; petioles 1–2.5 cm long. *Flowers* several to numerous in the axils; pedicels 3–7 mm long; sepals (4–)5(–6), 1–2 mm long; corolla 3.5–6 mm long, the lobes (4–)5(–6), less than ½ the length of the tube; filaments attached at the level of the sinuses; ovary 4–12-loculed. *Fruit* fleshy, subglobose to ovoid, to 2 cm broad, 3–8-seeded; seed scar basilateral, extending to the middle of the seed or slightly beyond (Blackwell, 1968).

This species occurs in Costa Rica, Panama, and Venezuela (Amazonas).

BOCAS DEL TORO: Almirante, *Cooper* 353 (F). Without locality, *Wedel* 230 (F, MO). CANAL ZONE: Barro Colorado Island, *Aviles* 969 (F); *Bailey & Bailey* 397 (F); *Croat* 8012 (MO); *Ebinger* 210 (MO); *Gangham* 591 (F); *Hayes s.n.* (F, MO); *Shattuck* 778 (F), 969 (MO), 1024 (F, MO); *Starry* 82 (F), 118 (F); *Wetmore & Abbe* 169 (F); *Zetek* 3810 (EAP, F, MO), 4327 (F), 4330 (F). Sirri River, Trinidad Basin, *Pittier* 4005 (NY, US). COLÓN: Between Salud and Boca del Río Indio, *Howell* 28 (MO). 2–3 mi up Río Guanache, *Kennedy & Foster* 2153a (MO). Río Viejo, 4 km NE of Puerto Pilon, *Nee* 7178 (MO). DARIÉN: La Boca de Pirre, *Bristan* 1271 (MO). PANAMÁ: El Llano-Cartí Road, 2.3 km N of Panamerican Highway, *Nee & Dwyer* 9239 (MO).

3. DIPHOLIS

Dipholis A. DC. in DC., Prodr. 8: 188. 1844, nom. cons. TYPE: *D. salicifolia* (L.) A. DC.

Trees or shrubs lacking spines or thorns. *Leaves* alternate, exstipulate; blades coriaceous. *Flowers* small, subsessile to pedicellate; sepals 5, uniseriate; corolla lobes 5, each lobe divided into 3 segments; stamens epipetalous, the filaments attached at the level of the sinuses, the staminodes alternating with the stamens, petaloid, often erose, fimbriate or lacinate; ovary 5-loculed. *Fruit* baccate, abruptly tapering to a short persistent style; seeds solitary, the seed scar basal, rarely basilateral, small, scarcely longer than broad, the endosperm copious, the cotyledons thin and foliaceous.

Dipholis is a tropical North American genus of about 15 species found principally in the Greater Antilles.

Literature:

Cronquist, A. 1945. Studies in the Sapotaceae, III. *Dipholis* and *Bumelia*. J. Arnold Arbor. 26: 435–471 (*Dipholis*, 435–445).

1. ***Dipholis minutiflora*** Pittier, Contr. U.S. Natl. Herb. 13: 464. 1912. TYPE: Costa Rica, Dota Mts., forests of El Copey, *Tonduz 11935* (US, holotype; NY, isotype).

Tree to 30 m. *Leaves* 5–20 cm long, 2–10 cm wide, elliptic-oblongate to elliptic-obovate, rounded to acute; primary lateral veins 10–20 pairs; petiole 5–18 mm long. *Flowers* numerous at defoliated nodes; pedicels 3–10 mm long; sepals 5(–8), 1.5–2.2 mm long; corolla 4–4.5 mm long, the lobes 5, twice as long as the tube; filaments attached at the level of the sinuses; ovary 5-loculed. *Fruit* 1.5–2.5 cm long, 1–2 cm wide, the flesh scant, wrinkled when dry; seed solitary, the seed scar subbasal, broadly elliptic, 3–5 mm long (Blackwell, 1968).

This species ranges from Mexico to Panama.

CHIRIQUÍ: Cerro Punta, *Allen 1564* (EAP, F, MO). Quebrada Velo, Finca Lerida, *Allen 4676* (EAP, MO). Valley of the upper Río Chiriquí Viejo, *White 109b* (F, MO); *White & White 1* (MO). Bajo Mono, mouth of Quebrada Chiquero, along Río Caldera, *Woodson et al. 995* (F, MO). PANAMÁ: Hills above Campana, *Allen 1314* (EAP, F, MO). Cerro Jefe, *Gentry 4867* (MO).

4. ELAEOLUMA

Elaeoluma Baillon, Hist. Pl. 11: 293. 1892. TYPE: *E. schomburgkiana* (Miq.) Baillon.

Shrubs or small trees lacking spines. *Leaves* alternate, exstipulate; blades firm to coriaceous, the primary lateral veins generally few. *Flowers* short pedicellate; sepals 5, uniseriate; corolla lobes 5, lacking appendages; stamens epipetalous, the filaments attached to a very short corolla tube, the staminodes alternating with the stamens, rudimentary, the number irregular, often completely absent; ovary (2–)3(–5)-loculed. *Fruit* baccate; seeds solitary, the seed scar lateral, linear to very broad, the endosperm absent, the cotyledons fleshy.

Elaeoluma is a genus of 3 species found chiefly in northern South America.

1. ***Elaeoluma glabrescens*** (Mart. & Eichl.) Aubréville, *Adansonia*, n.s., 1: 26. 1961.

Lucuma glabrescens Mart. & Eichl. in Mart., *Fl. Bras.* 7: 72. 1863. TYPE: Brazil, Rio Negro between Barcellos and San Gabriel, *Spruce 2029* (photo MO; NY, P, isotypes).

Tree of unknown height. *Leaves* with petioles 10–15 mm long; blades ovate-elliptic to oblong-elliptic, firm to coriaceous, acuminate, 7–15 cm long, 3–7 cm wide, glabrous; primary lateral veins 9–12 pairs, slender, obscure above, slightly raised and evident beneath, the secondary and tertiary ones closely anastomosing. *Flowers* 5–10 in the axils or at recently defoliated nodes; pedicels 3–5 mm long; sepals 5(–6), ovate, 2–6 mm long, glabrate; corolla glabrous, 5–6 mm long, the lobes 5, elliptic, 3–5 times longer than the tube; filaments to 1.5 mm long, attached to the very short tube, the staminodes not observed; ovary pilose to minutely tomentose, (2–)3(–5)-loculed, the style 1–2 mm long, glabrous. *Fruit* obovoid to subglobose, smooth, glabrous, 2–4.5 cm long, 1–3 cm wide; seeds solitary, ovoid to obovoid, to 3 cm long, 2.5 cm wide, the seed scar covering about half the seed, ventral, extending the entire length.

This species occurs in Amazonian Brazil, Peru, and Panama.

Elaeoluma glabrescens is closely related to species of *Neoxythece*, but it is readily distinguished by its broad, ventral seed scar. The number of ovary locules has been used to separate these genera, but I have found it to be too variable to be useful in identifying specimens.

SAN BLAS: Chucunaque, 2–10 mi above the Cuna-Darién boundary, *Duke 8565* (MO).

5. MANILKARA

Manilkara Adanson, *Fam. Pl.* 2: 166. 1763, nom. cons. TYPE: *M. kauki* (L.) Dubard.

Trees lacking spines. *Leaves* alternate, exstipulate; blades coriaceous; primary lateral veins numerous, fine. *Flowers* long-pedicellate; sepals 6, biseriate; corolla lobes 6, each lobe often divided into 3 segments; stamens epipetalous, the filaments attached at the level of the sinuses, the staminodes alternating with the stamens, petaloid, rarely replaced by functional stamens; ovary 6–16-loculed. *Fruit* baccate; seeds 1–several, ovoid to laterally compressed, the seed scar basilateral, oval to linear, the endosperm copious, the cotyledons thin and foliaceous.

Manilkara is a pantropical genus of about 50 species.

Literature:

Cronquist, A. 1945. *Studies in the Sapotaceae, IV. The North American species of Manilkara.* *Bull. Torrey Bot. Club* 72: 550–562.

- a. Corolla lobes with broad dorsal appendages, appearing to be 18 in number.
- b. Flowers 3–12 per axillary fascicle; pedicel glabrous; fruit smooth or slightly roughened; seed solitary, the scar 5 mm broad, basilateral, barely reaching middle of seed
----- 1. *M. bidentata*

- bb. Flowers solitary in the leaf axils; pedicel tomentulose to glabrate; fruit mealy roughened; seeds several, the scar 2 mm broad, linear, from near the base to well beyond the middle of the seed 3. *M. meridionalis*
- aa. Corolla lobes entire or merely tridentate at the apex, appearing to be 6 in number.
 - c. Flowers 2–5 per axillary fascicle; pedicel strigillose; corolla tube less than half as long as the lobes; seed scar basilateral, linear, barely reaching the middle of the seed 2. *M. chicle*
 - cc. Flowers solitary in the leaf axils; pedicel rufous-tomentulose; corolla tube more than half as long as the lobes; seed scar linear, from near the base to well beyond the middle of the seed 4. *M. zapota*

1. ***Manilkara bidentata*** (A. DC.) Chevalier, Rev. Int. Bot. Appl. Arg. Trop. 12: 270. 1932.

Mimusops bidentata A. DC. in DC., Prodr. 8: 204. 1844. TYPE: French Guiana, Richard (not seen).

Tree to 35 m. *Leaves* 6–30 cm long, 3–12 cm wide, obovate to elliptic, obtuse to emarginate; petioles 1.5–4 cm long. *Flowers* 3–12 in the axils or at recently defoliated nodes; pedicels 1.2–3 cm long; sepals 4–6 mm long; corolla 5–7 mm long, the tube ca. $\frac{1}{5}$ of the total length, the lobes with 2 dorsal appendages as broad as and slightly longer than the lobes; ovary 6–10-loculed. *Fruit* smooth or slightly roughened, subglobose, 2–3.5 cm long, 1-seeded; seed scar basilateral, barely reaching the middle of the seed, ca. 5 mm broad (Blackwell, 1968).

This species occurs in Hispaniola, Puerto Rico, Lesser Antilles, northern South America and Panama.

BOCAS DEL TORO: Río San Pedro, between the Río Caña and Río Calovébora, Gordon 13 (MO). Without locality, Cox s.n. (US). CANAL ZONE: Hills around Gatún, Pittier 2699 (US). PANAMÁ: Chepo, Kluge 55 (EAP, US). SAN BLAS: Hills near Puerto Obaldía, Pittier 4318 (NY, US), 4384 (US).

2. ***Manilkara chicle*** (Pittier) Gilly, Trop. Woods 73: 14. 1943.

Achras chicle Pittier, J. Wash. Acad. Sci. 9: 436. 1919. TYPE: Guatemala, Izabal, Vega Grande, near Los Amates, Pittier 8537 (US, holotype; NY, isotype).

Tree to 40 m. *Leaves* 8–26 cm long, 3–8 cm wide, oblanceolate to elliptic, rounded to acuminate; petioles 1–3.5 cm long. *Flowers* 2–5 in the axils; pedicels 0.5–3 cm long; sepals 5–9 mm long; corolla 5.5–9 mm long, the tube $\frac{1}{6}$ – $\frac{1}{3}$ of the total length, the lobes without dorsal appendages; ovary 7–9-loculed. *Fruit* mealy roughened, subglobose, 2–4 cm long, 4–6-seeded; seed scar basilateral, barely reaching middle of the seed, narrow, 2 mm wide (Blackwell, 1968).

This species ranges from Mexico through Central America to Colombia.

CANAL ZONE: Ancón Hill, Standley 26384 (US). COCLÉ: La Pintada, Léon 22 (MO). COLÓN: Santa Rita Ridge, Gentry 6566 (MO). Santa Rita Ridge Road, 17 km from Boyd-Roosevelt Highway, Mori & Kallunki 5031 (MO). DARIÉN: Piñas, Duke 10653 (MO). Patiño, Pittier 5698 (US). LOS SANTOS: Ca. $\frac{1}{2}$ mi S of Pedasí, Stimson 5294 (MO, UC). PANAMÁ: Trapiche Island, Allen 2607 (EAP). San José Island, Johnston 342 (MO), 753 (MO, US). Cerro Peñón, 3 km S of Alcalde Díaz, Nee 8867 (MO). Around Alhajuela, Chagres Valley, Pittier 3457 (US).

3. ***Manilkara meridionalis*** Gilly, Trop. Woods 73: 12. 1943. TYPE: Costa Rica, Punta Arenas, Esparta, Biolley 17308 (US, holotype; NY, isotype).

Tree to 30 m. *Leaves* 5–13 cm long, 1.5–4.5 cm wide, elliptic to narrowly obovate, rounded to acuminate; petioles 1–2.7 cm long. *Flowers* solitary in the axils; pedicels 1–2.3 cm long; sepals 6–9 mm long; corolla 7–10 mm long, the tube $\frac{1}{2}$ – $\frac{2}{3}$ of the total length, the lobes with 2 dorsal appendages broader than but about equal in length to the lobes; ovary 9–12-loculed. *Fruit* mealy roughened, subglobose, 3–3.5 cm long, several seeded; seed scar basilateral, extending past the middle of the seed, linear, 2 mm wide (Blackwell, 1968).

This species ranges from Mexico through Central America to Colombia and Venezuela.

PANAMÁ: Taboga Island, Standley 27099 (US); Woodson *et al.* 1455 (MO, NY). Without locality, Hayes 793 (NY).

4. *Manilkara zapota* (L.) van Royen, Blumea 7: 410. 1953.

Achras zapota L., Sp. Pl. 2: 1190. 1753, based on *Sapota fructu ovato, majori* Plumier. *Sapota fructu ovato, majori* Plumier, Nov. Pl. Amer. Gen. 43, tab. 4. 1703. TYPE: Plumier's plate, for discussion see Moore & Stearn, Taxon 16: 382–395. 1967.

Tree to 40 m. *Leaves* 4–15 cm long, 1.5–6 cm wide, elliptic to oblong-elliptic, rounded to acuminate; petioles 0.8–3 cm long. *Flowers* solitary in the axils; pedicels 1.2–2.5 cm long; sepals 6–10 mm long; corolla 6–11 mm long, the tube $\frac{1}{2}$ – $\frac{2}{3}$ of the total length, the lobes without dorsal appendages; ovary 10–12-loculed. *Fruit* mealy roughened, subglobose, to 10 cm in diameter, (4–)8–12-seeded; seed scar basilateral, extending well past the middle of the seed, linear, 2 mm wide (Blackwell, 1968).

This species ranges from Mexico through Central America to northern South America and from Florida through the West Indies. It is widely cultivated and many collections represent introduced plants.

CANAL ZONE: Summit Gardens, Croat 6760 (MO); Mori & Kallunki 1875, 4532 (both MO). Balboa, Standley 27121 (MO, US), 30860 (US).

6. MASTICHODENDRON

Mastichodendron Cronquist, Lloydia 9: 245. 1946. TYPE: *M. foetidissimum* (Jacq.) Cronquist.

Trees lacking spines. *Leaves* alternate to subopposite, exstipulate; blades firm, the primary lateral veins few, curved. *Flowers* pedicellate; sepals 5, uniseriate; corolla lobes 5, lacking appendages; stamens epipetalous, the filaments attached near the level of the sinuses, the staminodes alternating with the stamens, ovate to deltoid or lanceolate, not petaloid; ovary 5-loculed. *Fruit* baccate; seeds solitary, the seed scar basilateral, circular to lanceolate, not extending past the middle of the seed, the endosperm copious, the cotyledons thin and foliaceous.

Mastichodendron is a tropical North American genus of about 6 species.

Literature:

Cronquist, A. 1946. Studies in the Sapotaceae, II. Survey of the North American genera. *Lloydia* 9: 241–292 (*Mastichodendron*, 244–252).

1. ***Mastichodendron capiri*** (A. DC.) Cronquist var. ***tempisque*** (Pittier) Cronquist, *Lloydia* 9: 250. 1946.

Sideroxylon tempisque Pittier, Contr. U.S. Natl. Herb. 13: 461. 1912. TYPE: El Salvador, La Laguna de Santa Tecla, Pittier 1917 (US).

Tree to 25 m. *Leaves* 6–15 cm long, 3–7 cm wide, generally elliptic, acuminate to rounded (emarginate); primary lateral veins 8–15 pairs; petioles 3–9 cm long. *Flowers* numerous at defoliated nodes; pedicels 3–8 mm long; sepals 5, 1.5–3.2 mm long; corolla 5–8 mm long, the lobes 5, twice as long as the tube; filaments attached at the level of the sinuses; ovary 5-loculed. *Fruit* yellow, 2.5–4 cm long, 2–3 cm wide, 1-seeded, the flesh scant, wrinkled when dry; seed scar basilateral, lanceolate to subglobose, 6–9 mm long, 4–6 mm wide (Blackwell, 1968).

This species ranges from Mexico through Central America to Panama.

COCLÉ: Penonomé, Williams 421 (F, NY, US). LOS SANTOS: Corozal de Macaracas, Lao 588 (MO).

7. MICROPHOLIS

Micropholis Pierre, Not. Bot. Sapot. 37. 1891. TYPE: *M. rugosa* (Swartz) Pierre.

Trees or shrubs lacking spines. *Leaves* alternate, exstipulate; blades firm, appearing striate, the primary lateral veins numerous, fine, crowded, nearly straight. *Flowers* pedicellate; sepals 5, uniseriate; corolla lobes 5, lacking appendages; stamens epipetalous, the filaments attached near the level of the sinuses, the staminodes alternating with the stamens, lanceolate to subpetaloid; ovary 5-loculed. *Fruit* baccate; seeds 1–several, the seed scar lateral, linear, the endosperm present but not copious, the cotyledons fleshy.

Micropholis is a tropical American genus of about 30 species.

Literature:

Cronquist, A. 1946. Studies in the Sapotaceae, II. Survey of the North American genera. *Lloydia* 9: 241–292 (*Micropholis*, 252–257).

1. ***Micropholis mexicana*** Gilly ex Cronquist, *Lloydia* 9: 257. 1946. TYPE: Mexico, Chiapas, Mt. Ovando, Escuintla, Matuda 4195 (F, K, MO, NY).

Tree to 20 m. *Leaves* with petioles 8–10 mm long, highly canaliculate; blades narrowly elliptic to elliptic-obovate, thin, abruptly acuminate, 10–15 cm long, 3–5 cm wide, essentially glabrous; primary lateral veins very numerous and fine, 0.2–0.3 mm apart. *Flowers* 5–10(–30) in the axils or at recently defoliated nodes; pedicels 4–8 mm long, rufous puberulent; sepals 5(–6), broadly ovate, 2.5–3.5 mm long, 2.5 mm wide, rufous pubescent abaxially, glabrous on the inner surface;

corolla white, glabrous, 5–6.5 mm long, the lobes 5, ovate, as long as or slightly longer than the tube; filaments 1–1.8 mm long, attached at the level of the sinuses, the staminodes 5, lance-subulate, 1.5–3 mm long; ovary rufous pubescent, 5-loculed, the style 5–6 mm long, glabrous. *Fruit* broadly ellipsoidal to pyriform, 2–3.5 cm long; seeds solitary, ellipsoidal, laterally compressed, 20–25 mm long, the seed scar linear, extending the length of the seed, to 5 mm wide.

This species occurs in Mexico, Belize and Panama.

The disjunct distribution of *Micropholis mexicana* is noteworthy, and Standley & Williams (Fieldiana, Bot. 24: 232. 1967) mention an apparently undescribed Panamanian species. However, I find no specific differences in the material from Panama.

PANAMÁ: Cerro Jefe, Foster & Kennedy 1871 (MO). El Llano-Cartí road, 12 km from Panamerican Highway, Mori et al. 4668 (MO).

8. MIMUSOPS

Mimusops L., Sp. Pl. 349. 1753. TYPE: *M. elengi* L.

Trees lacking spines. *Leaves* alternate; stipules caducous; blades glabrous or soon glabrate. *Flowers* pedicellate; sepals 8, biseriate; corolla lobes 8, each lobe divided into 3 segments; stamens epipetalous, the filaments attached at the level of the sinuses, the staminodes alternating with the stamens, usually simple, lanceolate or ligulate, densely pilose abaxially and along the margins; ovary usually 8-loculed. *Fruit* baccate; seeds 1–several, ovoid to laterally compressed, the seed scar basal to basilateral, scarcely longer than broad, the endosperm copious, the cotyledons thin and foliaceous.

A genus of about 40 species found throughout the Old World tropics. Two species are cultivated in Panama.

- | | | |
|-----|--|--------------------------|
| a. | Pedicels 40–70 mm long; leaves thick, the petioles 1–1.5 cm long, the primary lateral veins 8–10 pairs | 1. <i>M. commersonii</i> |
| aa. | Pedicels 7–8 mm long; leaves thin, the petioles 2–2.6 cm long, the primary laterals 15–25 pairs | 2. <i>M. elengi</i> |

1. *Mimusops commersonii* (G. Don) Engler, Monogr. Afrik. Pflanzen-Fam. 8: 77. 1904.

Imbricaria commersonii G. Don, Gen. Syst. 4: 35. 1838. TYPE: Madagascar, Commerson (P).

Tree to 20 m. *Leaves* with petioles 1–1.5 cm long; blades obovate to elliptic, thick, rounded to emarginate, (7–)10–13(–20) cm long, (4–)6–8(–11) cm wide, densely rufous pubescent, soon glabrate; primary lateral veins 8–10 pairs, the secondary ones parallel to the primary laterals and nearly the same size, the tertiary laterals irregularly anastomosing. *Flowers* 1–3 in the axils or at recently defoliated nodes; pedicels 4–7 cm long, stout, rufous pubescent; sepals 7–12 mm long, lanceolate, densely rufous pubescent; corolla glabrous, 7–13 mm long, the lobes 6–11 mm long with 2 dorsal appendages frequently divided 2–5 times, the tube 1–2 mm long; filaments 0.5–3.5 mm long, attached at the level of the sinuses, the staminodes lanceolate, 4–6 mm long, rufous pubescent; ovary densely rufous

pubescent, 8-loculed, the style 5–6 mm long. *Fruit* globose, 3–5 cm in diameter; seeds 2–8, laterally compressed, 2–2.5 cm long, the seed scar basal, nearly circular, 5 mm broad.

This species occurs in Madagascar and the Comores. It is cultivated in Panama and elsewhere in the tropics. The edible pulp of the fruit is reputedly mealy and sweet.

CANAL ZONE: Summit Garden, *Hayes 305* (US). VERAGUAS: Divisa, *Lao 4* (MO).

2. *Mimusops elengi* L., Sp. Pl. 349. 1753.

Tree to 15 m. *Leaves* with petioles 2–2.6 cm long; blades elliptic to elliptic-obovate, thin, 5–12 cm long, 4–6 cm wide, sparsely rufous pubescent, soon glabrate; primary lateral veins 15–25 pairs, fine, the secondary ones parallel to the primary laterals and nearly the same size, the tertiary laterals irregularly anastomosing. *Flowers* 1–3 in the axils; pedicels 7–8 mm long, rufous pubescent; sepals 6–7 mm long, triangular, pale rufous pubescent; corolla white, glabrous, 8–12 mm long, the lobes 6–9 mm long with 2 dorsal appendages of about equal length, the tube 2–4 mm long; filaments 1–3 mm long, attached at the level of the sinuses, the staminodes lanceolate, 4–6 mm long, pubescent; ovary densely pubescent, 8-loculed, the style 3–4 mm long. *Fruit* ovoid, smooth, 2–3 cm long, 1.5–2 cm thick; seeds solitary, ovoid, 1.5–2 cm long, the seed scar basilateral, nearly circular, 3 mm broad.

This species is from southeast Asia. It is cultivated in Panama and elsewhere in the tropics. It is a good shade tree with sweetly scented small white flowers.

CANAL ZONE: Coco Solo Navy Reservation, *Coffey s.n.* (MO). Cultivated street tree, *Nee 14035* (MO). Fort Clayton, *Tyson & Blum 2005* (MO). Curundu, *Tyson 3460, 3482* (both MO). PANAMÁ: Panama City, *Lao 455* (MO). Near Hotel Panama, *Nee 11492* (MO).

9. NEOXYTHECE

Neoxythece Aubréville & Pellegrin, *Adansonia*, n.s., 1: 16. 1961. TYPE: *N. elegans* (A. DC.) Aubréville.

Trees or shrubs lacking spines. *Leaves* alternate, exstipulate; blades firm to coriaceous, the primary lateral veins few, often obscure. *Flowers* short-pedicellate; sepals 5, uniseriate; corolla lobes 5, lacking appendages; stamens epipetalous, the filaments variously attached from near the base of the tube to the level of the sinuses, the staminodes alternating with the stamens, rudimentary, the number irregular, often completely absent; ovary 2(–3)-loculed. *Fruit* baccate; seeds solitary, the seed scar lateral, linear, usually extending nearly the entire length of the seed, the endosperm absent, the cotyledons fleshy.

Neoxythece is a tropical American genus of about 10 species found chiefly in northern South America.

Literature:

Cronquist, A. 1946. Studies in the Sapotaceae, VI. Miscellaneous notes. Bull. Torrey Bot. Club 73: 465–471 (*Oxythece*, 467–468).

- a. Fruit constricted basally to a stipe 8–15 mm long, not beaked, yellow orange; leaves glabrous, rarely pale pubescent beneath 1. *N. dura*
 aa. Fruit with a prominent beak to 1 cm long, not stipitate, purple black; leaves chestnut brown puberulent beneath 2. *N. maguirei*

1. ***Neoxythece dura*** (Eyma) Aubréville & Pellegrin, *Adansonia*, n.s., 1: 17. 1961.

Pouteria dura Eyma, *Recueil Trav. Bot. Néerl.* 33: 187. 1936. TYPE: Guyana, *Schomburgk 910* (not seen).

Tree to 8 m. *Leaves* with petioles 10–15 mm long; blades obovate to elliptic-obovate, firm to coriaceous, acute to rarely rounded, acuminate, 4–8 cm long, 2–3 cm wide, glabrous above, rarely pale puberulent beneath, glabrate; primary lateral veins 13–18 pairs, obscure, the secondary and tertiary ones obscure. *Flowers* 2–7 in the axils or at recently defoliated nodes; pedicels 5 mm long; sepals 5, ovate, 1–2 mm long, 1–2 mm wide, abaxially rufous pubescent; corolla glabrous, 3 mm long, the lobes 5, ovate, as long as the tube; filaments to 0.5 mm long, attached near the middle of the tube, the staminodes 0–5, minute, deltoid; ovary hirsute, 2-loculed, the style 3 mm long. *Fruit* constricted basally to a stipe 8–15 mm long, subglobose above the stipe, yellow orange, rufous pubescent, 3–5 cm long, 2–2.5 cm broad; seeds solitary, ovoid, laterally compressed, to 2.5 cm long, the seed scar linear, extending nearly the entire length of the seed, 1–2 mm wide.

This species occurs in Brazil (Amazonas), Surinam, Guyana, Venezuela, Colombia, and Panama.

Neoxythece dura is very closely related to *N. maguirei*, but its yellow orange, basally constricted fruits, even when they are young, readily distinguish it from the purple black fruits of *N. maguirei*.

DARIÉN: Without locality, *Duke & Bristan 8336* (MO). PANAMÁ: Road between El Llano and Cartí-Tupile, 12 mi above Panamerican Highway, *Liesner 1328* (MO, NY, UC).

2. ***Neoxythece maguirei*** Aubréville, *Mem. New York Bot. Gard.* 23: 223. 1972.

TYPE: Venezuela, Amazonas, Río Guainía, infrequent in Caño Pimichín below Pimichín, *Maguire & Wurdack 35614* (NY, holotype; NY, isotype).

Shrub or small tree to 6 m. *Leaves* with petioles 10–15 mm long, highly canaliculate; blades obovate to obovate-elliptic, coriaceous, rounded, often cuspidate, 6–8 cm long, 3–3.5 cm wide, glabrous above, distinctly chestnut brown puberulent beneath; primary lateral veins 14–18 pairs, slender, the secondary and tertiary ones obscure. *Flowers* 1–7 at recently defoliated nodes; pedicels 4–5 mm long; sepals 5, ovate, 1.5–2 mm long, 1.5–2 mm wide, abaxially sparsely pubescent; corolla white, glabrous, 3–3.5 mm long, the lobes 5, ovate, ca. as long as the tube; filaments to 0.5 mm long, attached near the middle of the tube, the staminodes not observed; ovary hirsute, 2-loculed, the style 0.5 mm long. *Fruit* with a prominent beak to 1 cm long, ovoid, black purple, rufous pubescent, 2.5–3 cm long, 1–1.5 cm wide; seeds solitary, ellipsoidal, 17 mm long, 8 mm wide, 5 mm thick, the seed scar linear, extending nearly the entire length of the seed, 1–1.5 mm wide.

This species occurs in Venezuela (Amazonas) and Panama.

Neoxythece maguirei is similar and presumably closely related to *N. dura*.

PANAMÁ: El Llano-Cartí Highway, 17–20 km N of El Llano, *Dressler 4630* (MO). El Llano-Cartí road, km 12, *Croat 26045* (MO).

10. POUTERIA

Pouteria Aublet, *Hist. Pl. Guiane* 1: 85. *pl.* 33. 1775. TYPE: *P. guianensis* Aublet.

Trees or shrubs lacking spines. *Leaves* alternate or rarely subopposite, exstipulate; blades membranous to coriaceous, the primary lateral veins generally few, strongly arcuate near the margin. *Flowers* sessile to long-pedicellate; sepals 4–12, spiral or in 1 or 2 series; corolla lobes 4–6, lacking appendages; stamens epipetalous, occasionally abortive, the filaments variously attached from near the base of the tube to the level of the sinuses, the staminodes alternating with the stamens, petaloid to rudimentary; ovary 1–10-loculed. *Fruit* fleshy, occasionally sclerotic; seeds 1–several, the seed scar lateral, linear to very broad, the endosperm absent, the cotyledons fleshy.

Pouteria is a genus of perhaps 100 species found chiefly in tropical America.

Pouteria has been viewed quite differently by various workers. Baehni (1942) considered it in a very broad sense and included over 300 distinct species. More recently Baehni (1965) split the genus somewhat, but his list of generic synonyms still includes over twenty names, and a list of probable synonyms adds twenty more. Aubréville (1965, 1972) and Lundell (1976) have adopted much narrower generic concepts. Following Aubréville's nomenclature the Panamanian *Pouteria* would be split into no fewer than nine genera.

Blackwell (1968) followed the system proposed by Cronquist (1946), and I follow roughly the same generic limits for American Sapotaceae, particularly *Pouteria*. This is done with the knowledge that several segregates of *Pouteria* are probably sound and deserve recognition at least at the subgeneric level. Otherwise we are left with a large but still poorly defined genus. Unfortunately many of the segregate genera themselves are poorly defined, being based on relatively few specimens. As more material is collected, the generic limits may have to be shifted. This is particularly true among American species. Large series of specimens exist for relatively few species, and the number of species only known from the type collection is large. If Panamanian *Pouteria* can be used as an example, 7 of 25 species are known from only the type specimen or type locality. Similarly many species lack complete descriptions of flowers and/or fruits. In this treatment flowers of three *Pouteria* species are adequately described for the first time.

Aubréville (1965, 1972) has proposed the most complete scheme for dividing *Pouteria* (*sensu lato*) into its narrower generic units. To aid those unfamiliar with his many important works, which are exclusively in French, I have included in this portion of the treatment the name adopted by Aubréville. When it is certain, this name has been placed in the synonymy along with the basionym. A few species are known from such scanty material that correct placement in Aubré-

ville's scheme is uncertain. It should be noted that only 3 of the 25 Panamanian *Pouteria* would be retained in this genus by Aubréville.

Literature:

Aubréville, A. 1961. Notes sur des Poutériées Américaines. *Adansonia*, n.s., 1: 150–191.

Baehni, C. 1942. Mémoires sur les Sapotacées, II. Le Genre *Pouteria*. *Candollea* 9: 147–476.

Cronquist, A. 1946. Studies in the Sapotaceae, II. Survey of the North American genera. *Lloydia* 9: 241–292 (*Pouteria*, 257–291).

Lundell, C. L. 1976. Studies of American plants, XII. *Wrightia* 5: 241–259 (Sapotaceae, 252–256).

- a. Sepals 8–12, evidently spiralled, increasing in size centripetally.
 - b. Fruit fleshy.
 - c. Leaves with 20–50 primary lateral veins; pedicels to 2 mm long; sepals often emarginate; corolla lobes as long as the tube 19. *P. sapota*
 - cc. Leaves with 12–20 primary lateral veins; pedicels 4–6 mm long; sepals entire or scarcely emarginate; corolla lobes much shorter than the tube 13. *P. fossicola*
 - bb. Fruit woody.
 - d. Leaves with 8–13 primary lateral veins; sepals thick and fleshy 8. *P. cooperi*
 - dd. Leaves with 13–20 primary lateral veins; sepals thin 20. *P. sclerocarpa*
- aa. Sepals 4–7, imbricate or quincuncial, about equal in length.
 - e. Flowers sessile, the pedicels 2 mm long or less.
 - f. Sepals 5–7; filaments attached at the level of the sinuses between the corolla lobes (unknown in *P. chiricana*).
 - g. Corolla 6–8 mm long; sepals 6 or 7; corolla tube longer than the corolla lobes 20. *P. sclerocarpa*
 - gg. Corolla 2.5–5.5 mm long; sepals 5; corolla tube shorter than the corolla lobes.
 - h. Secondary lateral veins fine, close, sinuous but regularly disposed 23. *P. subrotata*
 - hh. Secondary lateral veins rather coarse, irregularly disposed.
 - i. Fruit ovoid to subglobose; sepals 2.5–5.5 mm long 10. *P. durlandii*
 - ii. Fruit ellipsoid, narrowed to a stipitate base; sepals 2–2.6 mm long 6. *P. chiricana*
 - ff. Sepals 4(–5); filaments attached at the middle or base of the corolla tube (unknown in *P. sambuensis*).
 - j. Fruit fleshy.
 - k. Fruit glabrous 2. *P. caimito*
 - kk. Fruit conspicuously hairy 18. *P. sambuensis*
 - jj. Fruit woody or gall-like.
 - l. Fruit covered with hairy processes to 2 cm long; sepals 7–9 mm long; corolla 6–9 mm long 16. *P. neglecta*
 - ll. Fruit glabrous to pubescent, but no long hairy processes; sepals 2.5–4 mm long; corolla 2.5–4 mm long 22. *P. stylosa*
 - ee. Flowers pedicellate, at least some pedicels 3 mm or more in length.
 - m. Corolla at least 7 mm long; largest sepals at least 4 mm long.
 - n. Corolla glabrous externally; pedicels 3–8 mm long.
 - o. Sepals 4.
 - p. Primary lateral veins of the leaves well marked, easily distinguished from the secondary ones; petioles 1.5–2.5 cm long; style 5–6 mm long 5. *P. carabobensis*
 - pp. Primary lateral veins difficult to distinguish from the secondary ones; petioles 1–1.5 cm long; style 6–11 mm long 9. *P. dominigensis*

- oo. Sepals 5–6 1. *P. buenaventurensis*
- nn. Corolla sparsely sericeous-strigose externally; pedicels 8–15 mm long
..... 4. *P. campechiana*
- mm. Corolla less than 6.5 mm long; sepals less than 3.5 mm long.
- q. Ovary with 1–3 locules.
- r. Leaves glabrous or essentially so 25. *P. unilocularis*
- rr. Leaves densely pubescent, at least beneath.
- s. Pubescence pale; leaves with 9–14 primary lateral veins
..... 24. *P. tarapotensis*
- ss. Pubescence rufous; leaves with 15–22 primary lateral veins
..... 3. *P. calistophylla*
- qq. Ovary with 4 or more locules.
- t. Sepals and corolla lobes generally 4-merous.
- u. Leaves finely pale sericeous beneath 12. *P. euryphylla*
- uu. Leaves sparsely pubescent to glabrous.
- v. Leaves 15–25 cm long, 8–15 cm wide; petiole 20–30 mm
long; pedicel 6–10 mm long; style 3–4 mm long
..... 14. *P. leptopedicellata*
- vv. Leaves 5–13 cm long, 2–5 cm wide; petiole 4–17 mm
long; pedicel 2–5 mm long; style 1–1.5 mm long
..... 21. *P. stipitata*
- tt. Sepals and corolla lobes generally 5-merous.
- w. Leaves crowded at ends of stout branches; flowers and fruits
borne on branches 7 mm or more in diameter
..... 7. *P. congestifolia*
- ww. Leaves scattered along slender branches; flowers and fruits
usually borne on branches less than 5 mm in diameter.
- x. Petiole flattened above, broadly canaliculate; fruit usu-
ally with 1 seed 11. *P. engleri*
- xx. Petiole nearly terete, narrowly canaliculate; fruit usually
with 5 seeds.
- y. Fruit mealy roughened, even when young
..... 15. *P. lucentifolia*
- yy. Fruit nearly smooth, slightly low-tuberculate
..... 17. *P. pentasperma*

1. *Pouteria buenaventurensis* (Aubréville) Pilz, comb. nov.

Richardella buenaventurensis Aubréville, *Adansonia*, n.s., 7: 146. 1967. TYPE: Colombia, Departamento del Valle, Río Yurumanguí, *Cuatrecasas 15821* (US).

Tree to 30 m. *Leaves* with petioles 1–2 cm long; blades elliptic to elliptic-oblongate, coriaceous, rounded to obtuse and occasionally abruptly acuminate, 8–18(–20) cm long, 4.5–6(–11) cm wide, sparsely rufous pubescent, glabrate; primary lateral veins 8–12 pairs, the secondary and tertiary laterals prominent, irregular, often branched, much of the venation perpendicular to the previous series. *Flowers* 1–3 in the axils and at recently defoliated nodes; pedicels 3–4 mm long; sepals 5–6, ovate, 3–6 mm wide, the outer 2–2.5 mm long, the inner 4–5 mm long, densely sericeous except on the margins and the lower portion of the adaxial surface; corolla greenish white, glabrous, cylindrical, 7–12 mm long, the lobes 5, rounded, about ½ as long as the tube; filaments 3 mm long, attached at the level of the sinuses or slightly below, the staminodes lanceolate, 2–2.5 mm long; ovary densely pubescent, (4–)5-loculed, the style 8–10 mm long. *Fruit* to 4 cm long, globose, mealy roughened, brown; seeds solitary, to 2.8 cm long, globose, the seed scar covering ½–⅔ of the seed surface.

This species occurs in Colombia and Panama.

Although the plants are morphologically very similar, it must be noted that the Colombian specimens are all from low elevations (Departamento del Valle), while the Panamanian material was collected at elevations of 350 to 1,000 m.

COLÓN: Santa Rita Ridge road, 14 km from Boyd-Roosevelt Highway, *Mori & Kallunki 4907* (MO). PANAMÁ: Cerro Jefe, *Dwyer 9495* (F, MO); *Gentry 4874, 6144* (both MO). N of Goofy Lake, *Folsom et al. 1959* (MO). 16–20 km above Panamerican Highway on road from El Llano to Cartí-Tupile, *Kennedy 2709* (MO). 9–20.7 km above Panamerican Highway on road from El Llano to Cartí, *Mori & Kallunki 4686, 5113, 5151* (all MO).

2. ***Pouteria caimito*** (Ruiz & Pavón) Radlkofer, Sitzungsber. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. München 12: 333. 1882; Aubréville, *Adansonia*, n.s., 1: 154. 1961.

Achras caimito Ruiz & Pavón, Fl. Peruv. 3: 18, pl. 240. 1802. TYPE: Peru, *Ruiz & Pavón* (F, isotype).

Tree to 30 m. *Leaves* 5–24 cm long, 2–9 cm wide, obovate-oblongate to elliptic, acuminate, rarely acute; petioles 5–15 mm long. *Flowers* 1–5 per axil, subsessile to sessile; sepals 4(–5), 3–4.5 mm long; corolla 5–8 mm long, the lobes 4(–5), about as long as the tube; filaments attached near the middle of the tube; ovary 4(–6)-loculed. *Fruit* yellow to brown, fleshy, 5–10 cm long, 4–8 cm wide, 1–4-seeded; seed scar extending the entire length of the seed, 3–4 mm wide (Blackwell, 1968).

This species occurs in Peru and Brazil and through northern South America to Panama. It is occasionally cultivated.

COLÓN: Salud Hills, *Lao & Holdridge 192* (MO, tentative identification of sterile specimen). DARIÉN: Sambú River, *Pittier 5555* (F, US).

3. ***Pouteria calistophylla*** (Standley) Baehni, *Candollea* 9: 419. 1942.

Lucuma calistophylla Standley, Publ. Field Mus. Nat. Hist., Bot. Ser. 4: 252. 1929. TYPE: Panama, *Cooper 481* (F, holotype; K, NY, US, isotypes).

Tree ca. 20 m tall. *Leaves* 10–22 cm long, 5–10 cm wide, obovate or elliptic-obovate, acuminate; primary lateral veins 15–22 pairs; petioles 1–3 cm long. *Flowers* imperfectly known; pedicel ca. 5 mm long; sepals 5, ca. 2 mm long; corolla 5-lobed; filaments attached at the level of the sinuses; ovary probably 2-loculed. *Fruit* unknown (Blackwell, 1968).

Known definitely only from the type collection.

BOCAS DEL TORO: Cricamola Valley, *Cooper 481* (F, K, NY, US).

4. ***Pouteria campechiana*** (H.B.K.) Baehni, *Candollea* 9: 398. 1942.

Lucuma campechiana H.B.K., Nov. Gen. Sp. Pl. 3: 240. 1819. TYPE: Mexico, near Campeche, *Humboldt & Bonpland* (photo F).

Richardia campechiana (H.B.K.) Pierre, Not. Bot. Sapot. 20. 1890; Aubréville, *Adansonia*, n.s., 1: 175. 1961.

Radlkoferella glabrifolia (Pittier) Aubréville, Mem. New York Bot. Gard. 23: 206. 1972.

Lucuma glabrifolia Pittier, Contr. U.S. Natl. Herb. 20: 481. 1922. TYPE: Panama, *Pittier 6542* (US, holotype; EAP, F, NY, isotypes).

Tree to 30 m. *Leaves* 10–35 cm long, 4–10 cm wide, elliptic to narrowly obovate, acuminate to rarely rounded; primary lateral veins 12–20 pairs; petioles 1–3 cm long. *Flowers* (1–)2–4(–9) per axil; pedicels 8–15 mm long; sepals (4–)5(–6), 5–10(–12) mm long; corolla 7–14 mm long, the lobes (4–)5(–7), as long as the tube or somewhat shorter; filaments attached slightly below the level of the sinuses; ovary (4–)5(–10)-loculed. *Fruit* yellow at maturity, fleshy and edible, to 7 cm long, 7 cm wide, 1–4-seeded; seed scar extending the entire length of the seed, 1–2 cm broad (Blackwell, 1968).

This species ranges from Mexico to Amazonas, Brazil. It is widely cultivated and many collections represent introduced plants.

Aubréville (1961, 1972) placed plants of this species into two closely related genera as *Richardella campechiana* and *Radlkoferella glabrifolia*. The variability in the number of flower parts, particularly the number of sepals and ovary locules, as well as leaf size and shape, and fruit characteristics has resulted in the proposal of at least ten allied taxa. Segregation of this species into related species or even subspecies would be artificial until extensive monographic studies are undertaken.

CANAL ZONE: Ancón, *Piper* 6027 (F, US). Barro Colorado Island, *Zetek* 5562 (EAP, MO). COCLÉ: Penonomé, *Williams* 56 (US). COLÓN: Donoso, *Holdridge* 6202 (MO). DARIÉN: Casaya Island, *Duke* 10374 (MO). Piñas, *Duke* 10589 (MO). Pinogana, *Pittier* 6542 (EAP, F, NY, US). 2 mi E of Santa Fé, *Tyson et al.* 4839 (MO). LOS SANTOS: Punta Mala, *Croat* 9751 (MO). 16 mi S of Macaracas at Quebrada Bejuco, *Tyson et al.* 3092 (MO). PANAMÁ: Trapiche Island, *Allen* 2609, 2627 (both EAP, F); *Miller* 1875, 1902 (both US). Chepillo Island, *Duke* 10320 (MO). Saboga Island, *Duke* 10343 (MO). Espiritu Santo Island, *Duke* 10454 (MO). San José Island, *Erlanson* 201, 235 (both US), 396 (EAP, US); *Johnston* 526, 733, 1171 (all MO, US); *Miller* 1928 (US). Río Pasiga, *Gentry* 2310 (MO). Chichebre, Chepo, *Holdridge* 6497 (MO). Pacheca Island, *Tyson et al.* 5601, 5604 (both MO). VERAGUAS: Bahía Honda, Pueblo Nuevo, *Barclay* 2827 (MO).

5. ***Pouteria carabobensis*** Pittier, *Contr. Fl. Venez.* 12. 1921. TYPE: Venezuela, hills of Guaremales, road from Puerto Cabello to San Felipe, *Pittier* 8921 (US, holotype, photo MO; NY, isotype).

Tree to 25 m. *Leaves* with petioles 15–25 mm long; blades elliptic to elliptic-obovate, thin to firm, obtuse to acute, often abruptly acuminate, 12–22 cm long, 4–10 cm wide, very sparsely gray pubescent to glabrous; primary lateral veins 11–13 pairs, thin, the secondary laterals curved, oblique to the primary ones, those near the margin straighter and nearly perpendicular, the tertiary laterals very fine, anastomosing. *Flowers* 4–7 in the axils and at recently defoliated nodes; pedicels 3–8 mm long; sepals 4, ovate, 4 mm long, 4–5 mm wide, the outer ones pubescent on the abaxial surface, the inner ones and adaxial surfaces glabrous; corolla papillose, glabrous, 7–13 mm long, the lobes 4–5(–6), ovate, nearly equal to much shorter than the tube; filaments 1–2 mm long, attached at the level of the sinuses, the staminodes broadly lanceolate, 1.5–3 mm long; ovary pale pilose, 4-loculed, the style glabrous, 5–6 mm long. *Fruit* reputedly edible, otherwise unknown.

This species occurs in Venezuela and Panama.

Plants of this species have highly variable flowers. I have seen only flowers with 4 sepals, but the corollas may be 4–6-merous on the same branch.

DARIÉN: Río Tuquese, at middle Tuquesa Mining Company camp called Charco Peje, riverside, *Mori 7101* (MO).

6. ***Pouteria chiricana*** (Standley) Baehni, *Candollea* 9: 420. 1942.

Lucuma chiricana Standley, *Publ. Field Mus. Nat. Hist., Bot. Ser.* 4: 251. 1929. TYPE: Panama, *Cooper & Slater 254* (F, holotype; NY, US, isotypes).

Tree to 30 m. *Leaves* 8–16 cm long, 2.5–6 cm wide, elliptic to oblong, acuminate; petioles 6–17 mm long. *Flowers* subsessile in the axils; sepals 5, 2.2–2.6 mm long; corolla 3–3.2 mm long, the lobes 5, about twice as long as the tube; ovary 4-loculed. *Fruit* fleshy, 3–3.5 cm long, 2–2.5 cm wide, 1-seeded; seed scar extending the length of the seed, ca. 8 mm wide (Blackwell, 1968).

This species occurs in Costa Rica and Panama.

Flowers with stamens have not been collected for *Pouteria chiricana*. Other Central American *Pouteria* known to possess heteromorphic flowers are *P. amydalina*, *P. durlandii*, and *P. stipitata*.

BOCAS DEL TORO: Almirante region, *Cooper 445* (F, NY), *457* (EAP, F, NY). CHIRIQUÍ: Progreso, *Cooper & Slater 230, 254* (both F, NY, US). Burica Peninsula, 9 mi S of Puerto Armuelles, *Croat 22107* (MO, NY).

7. ***Pouteria congestifolia*** Pilz.³ TYPE: Panama, *Allen 3426* (MO, holotype; EAP, F, isotypes).

Tree 30 m tall. *Leaves* crowded at the ends of stout branches; petioles 2–3 cm long; blades oblanceolate, firm, 15–20 cm long, to 5 cm wide, mucronate to shallowly emarginate, sparsely pilose; primary lateral veins 15–20 pairs, the secondary ones somewhat sinuous, generally perpendicular to the primary laterals, the tertiary ones highly reticulate, nearly as prominent as the secondaries. *Flowers* 2–4 in the axils or at recently defoliated nodes; pedicels 4–10 mm long, rufous pubescent; sepals 5, ovate, 3–4 mm long, 2.5–3 mm wide, densely rufous sericeous externally except for the margin of the inner sepals, the adaxial surface of all sepals glabrous; corolla green, 4–5 mm long, the 5 lobes ciliolate, sparsely pubescent, about as long as the tube; filaments 1.5–2 mm long, attached near base of the tube, the staminodes lanceolate, 0.7 mm long; ovary 1–1.5 mm high, densely rufous pilose, 4–5-loculed, the style 1.5 mm tall, 5-lobed. *Fruit* unknown.

Known only from two collections. They are curious specimens that do not seem to be closely related to any species of my acquaintance. The combination of a 5-merous flower with filaments inserted near the base of the corolla tube and with well-developed staminodes is not frequently observed in American Sapo-

³ *Pouteria congestifolia* Pilz, sp. nov. *Arbor* 25 m alta. *Folia* ad ramulorum apicem dense congesta; petioli 2–3 cm longi; laminae oblanceolata, firmae, 15–20 cm longa, 4–5 cm lata, apice mucronata vel emarginata; costae 15–20 jugatae. *Flores* 2–4 ad axillam foliorum persistentium vel delapsorum fasciculati; pedicelli rufo-pubescentes, 4–10 mm longi; sepala 5, ovata, 3–4 mm longa, 2.5–3 mm lata, dorso rufo-sericeo, intus glabro; corolla 4–5 mm longa; lobi 5, ciliolati, tubo aequilongi; filamenta 1.5–2 mm longa, fere ad basin tubi affixa; staminodia lanceolata, 0.7 mm longa; ovarium 1–1.5 mm altus, dense pilosum, 4–5-loculare, cum stylo 1.5 mm longum. *Bacca* ignota.

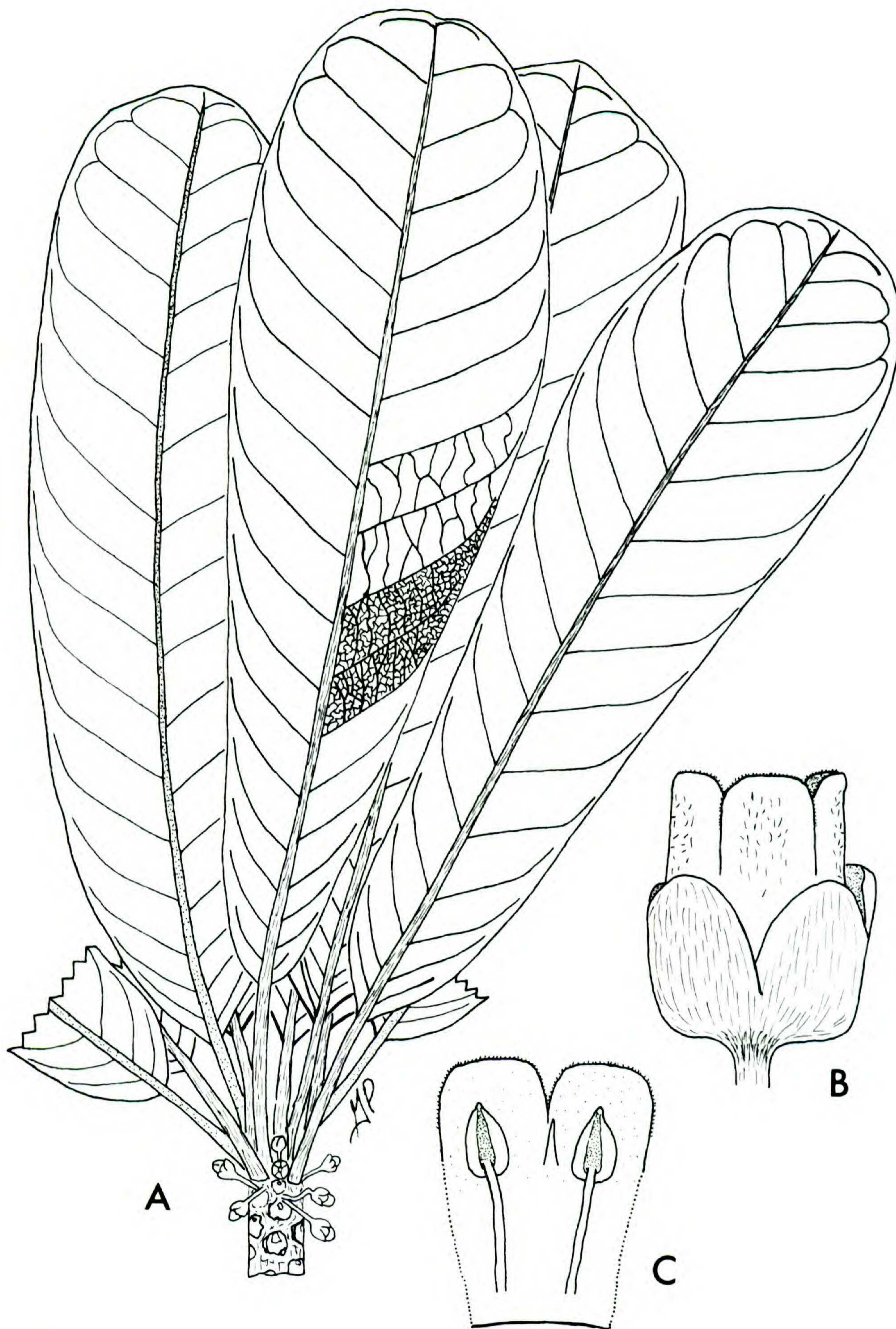


FIGURE 1. *Pouteria congestifolia* Pilz.—A. Habit ($\times 7/10$).—B. Flower ($\times 7$).—C. Corolla fragment ($\times 7$). [After Allen 3426 (MO).]

taceae. Further generic speculation awaits the collection of fruits from this species.

The epithet *congestifolia* draws attention to the manner in which the leaves are crowded at the ends of stout branches.

CHIRIQUÍ: East of the Fortuna dam site, *Mendoza 370* (MO). COCLÉ: El Valle de Antón, 1000 m, *Allen 3426* (EAP, F, MO).

8. ***Pouteria cooperi*** Cronquist, *Lloydia* 9: 291. 1946. TYPE: Panama, *Cooper 499* (NY, holotype; EAP, F, US, isotypes).

Calocarpum cooperi (Cronquist) Lundell, *Wrightia* 5: 252. 1976.

Tree ca. 15 m tall. *Leaves* 8–17 cm long, 3–7 cm wide, elliptic or narrowly obovate, acuminate; primary lateral veins 8–13 pairs; petioles 1–3 cm long. *Flowers* sessile; calyx of 10 or more thick, fleshy, broad sepals to 5 mm long; other flower parts unknown. *Fruit* reputedly woody (Blackwell, 1968).

This species is known only from the type collection.

BOCAS DEL TORO: Almirante region, Cricamola Valley, *Cooper 499* (EAP, F, NY, US).

9. ***Pouteria dominigensis*** (Gaertner f.) Baehni var. ***dominigensis***, *Lloydia* 9: 278. 1946.

Lucuma dominigense Gaertner f., *Fruct.* 3: 131. 1807. TYPE: Haiti, *Poiteau*, not seen.

Radlkofarella domingensis (Gaertner f.) Pierre, *Not. Bot. Sapot.* 21. 1890; Aubréville, *Adansonia*, n.s., 1: 185. 1961.

Tree to 10 m. *Leaves* 4–13 cm long, 2–6 cm wide, obovate-oblongate, rounded, rarely acute; primary lateral veins 10–20 pairs; petioles 1–1.5 cm long. *Flowers* usually several per axil; pedicels 3–8 mm long; sepals 4, 4–9 mm long; corolla 8–16 mm long, the lobes (5–)6, about as long as the tube; filaments attached at the level of the sinuses; ovary (5–)6(–8)-loculed. *Fruit* yellow, fleshy, 2–5 cm long, 3–6 cm wide, 1–several-seeded; seed scar variable in length, 3–10 mm broad (Blackwell, 1968).

This species occurs in West Indies and southern Florida. It is cultivated in the Canal Zone.

CANAL ZONE: Without locality, *Johansen 36* (F, NY, US). Ancón, *Mell s.n.* (F, NY). Balboa, *Standley 26894* (F, MO, US), *30859* (F, US).

10. ***Pouteria durlandii*** (Standley) Baehni, *Candollea* 9: 422. 1942.

Lucuma durlandii Standley, *Trop. Woods* 4: 5. 1925. TYPE: Guatemala, Departamento Petén, El Paso, *Durland s.n.* (US, holotype; F, isotype).

Peteniodendron durlandii (Standley) Lundell, *Wrightia* 5: 254. 1975.

Paralabatia durlandii (Standley) Aubréville, *Adansonia*, n.s., 3: 21. 1963.

Tree to 25 m. *Leaves* with petioles 1–3 cm long; blades obovate to oblanceolate, firm, obtuse to abruptly acuminate, 10–25 cm long, 4–9 cm wide, essentially glabrous above, pale pubescent beneath, glabrate; primary lateral veins 8–13 pairs, the secondary and tertiary ones equally prominent with raised veins be-

neath. *Flowers* 1–3 in the axils or at recently defoliated nodes, often heteromorphic and unisexual, the pistillate flowers generally smaller than the staminate ones; pedicels 1–2 mm long, densely rufous pubescent; sepals 5, ovate, 2.5–4 mm long, 2–2.5 mm wide, sparsely to densely rufous pubescent; corolla greenish white, glabrous, 3–5.5 mm long, the lobes 5, ovate, equal in length to twice as long as the tube; filaments 0.5–1.5 mm long, attached at the level of the sinuses, the staminodes petaloid to lanceolate, 0.5–2 mm long; ovary densely rufous pubescent, 2(–5)-loculed, the style 0.8–1.5 mm long. *Fruit* yellow, subglobose, densely rufous pubescent, glabrate, to 2.5 cm long; seeds 1–3, ovoid to subglobose, to 2 cm long, the seed scar extending nearly the entire length of the seed, 4–11 mm broad, covering $\frac{1}{3}$ – $\frac{1}{2}$ of the seed.

This species occurs in Mexico, Guatemala, Belize, Honduras, Costa Rica, and Panama.

Peteniodendron Lundell (1975) is distinguished by its heteromorphic unisexual flower, 2–3-loculate ovary, pubescent fruits, and large seed scars. None of the above characteristics are unique to *Peteniodendron* and within the highly reticulated Pouteriae *Peteniodendron* does not, at this time, deserve generic recognition. Other Central American *Pouteria* known to possess heteromorphic unisexual flowers are *P. amydalina*, *P. chiricana*, and *P. stipitata*.

Only young fruiting specimens have been collected in Panama, and their identity is problematic. Panamanian material differs from typical *Pouteria durlandii* in generally having 5-loculed ovaries, although ovaries with 2–5 locules were observed on the same branch.

DARIÉN: Without locality, *Duke* 8357 (MO). Pirre, *Duke & Bristan* 248 (MO).

11. ***Pouteria engleri*** Eyma, *Recueil Trav. Bot. Néerl.* 33: 178. 1936. TYPE: French Guiana, *Mélinon s.n.* (P, holotype; K, isotype).

Nemaluma engleri (Eyma) Aubréville & Pellegrin, *Adansonia*, n.s., 1: 31. 1961.

Tree to 20 m. *Leaves* with petioles 10–15(–25) mm long; blades obovate to elliptic-ovate, firm, rounded, mucronate, 6–15(–20) cm long, 3–8(–13) cm wide, very sparsely pale pubescent, glabrate; primary lateral veins 7–11 pairs, distinct, the secondary and tertiary ones obscure above, evident beneath, sinuous, areoles incomplete to lacking. *Flowers* 1–10(–20) in the axils of the leaves; pedicels 4–7 mm long, sparsely rufous pubescent; sepals 5, ovate, 2–2.2 mm long, 2 mm wide, sparsely rufous pubescent, glabrate; corolla greenish white, glabrous, 3.5–4 mm long, the lobes 5, ovate, about as long as the tube; filaments 1 mm long, attached near the middle or base of the tube, the staminodes rare, variable in number, deltoid, minute; ovary pale pubescent, 4–5-loculed, the style 2 mm long. *Fruit* ellipsoidal, 18–23 mm long, smooth, glabrous; seeds 1–5, ovoid, laterally compressed, 14–18 mm long, the seed scar linear, extending the entire length of the seed, 2.5 mm wide.

This species occurs in Surinam, Guyana, French Guiana, and Panama.

COLÓN: María Chiquita, *Holdridge* 6524 (MO). PANAMÁ: El Llano to Cartí, *Correa et al.* 1838 (MO, tentative identification of a badly parasitized specimen).

12. ***Pouteria euryphylla*** (Standley) Baehni, *Candollea* 9: 249. 1942.

Lucuma euryphylla Standley, *Publ. Field Mus. Nat. Hist., Bot. Ser.* 4: 252. 1929. TYPE: Panama, *Cooper 611* (F, holotype; NY, isotype).

Tree ca. 15 m. *Leaves* 10–22 cm long, 4–12 cm wide, elliptic or obovate-elliptic, acuminate; primary lateral veins 9–13 pairs; petioles 1.5–6 cm long. *Flowers* few per axil; pedicels 4–5 mm long; sepals 4, ca. 3.5 mm long; corolla 3.7–4.5 mm long, the lobes 4(–5), about as long as the tube; filaments attached at about the middle of the tube; ovary 4-loculed. *Fruit* unknown (Blackwell, 1968).

Known only from the type collection. Most likely related to four species from Brazil and northern South America that are placed by Aubréville in *Pseudolabatia*.

BOCAS DEL TORO: Almirante region, Buena Vista Camp, *Cooper 611* (F, NY).

13. ***Pouteria fossicola*** Cronquist, *Lloydia* 9: 289. 1946. TYPE: Panama, Canal Zone, Barro Colorado Island, north shore near Pearson terminal, *Salvoza 999* (A, not seen).

Calocarpum fossiculum (Cronquist) Lundell, *Wrightia* 5: 252. 1976.

C. borucanum Standley & L. O. Williams, herbarium name, never validly published.

Tree to 30 m. *Leaves* 8–30 cm long, 4–13 cm wide, obovate, short-acuminate to obtuse; primary lateral veins 12–20 pairs; petioles 1–4.5 cm long. *Flowers* 1–5 in the axils of the leaves or at recently defoliated nodes; pedicels 4–6 mm long; sepals (6–)8(–9), spirally arranged, to 7 mm long; corolla white, densely pubescent except for the margins of the lobes and the base of the tube, cylindrical, 9–11 mm long, the tube comprising $\frac{3}{4}$ of the total length, the lobes 5, ovate; filaments attached at the level of the sinuses or slightly below, 1–1.5 mm long, the staminal nodes lanceolate, 1–1.2 mm long; ovary 5-loculed. *Fruit* yellow green to grayish white, fleshy, 8–15 cm long, 4–9 cm wide, 1(–2)-seeded; seed scar extending the entire length of the seed, 3–4 cm broad (Blackwell, 1968).

This species occurs in Panama and southeastern Costa Rica.

As presently circumscribed, this species, once known only from Barro Colorado Island (Blackwell, 1968), extends to Puntarenas, Costa Rica, *Allen 5753* and *6636* (both EAP).

CANAL ZONE: Barro Colorado Island, *Bangham 583* (F); *Zetek 3870* (F, MO). COCLÉ: El Valle de Antón, *Lao 278* (MO). El Valle de Antón, 600 m, cultivated tree, *Nee & Dwyer 9218* (MO). COLÓN: Santa Rita lumber road, 9.4 km from Transisthmian Highway, *Dressler 3811* (MO).

14. ***Pouteria leptopedicellata*** Pilz.⁴ TYPE: Panama, *Mori & Kallunki 5064* (MO).

Tree 20 m tall. *Leaves* with petioles 2–3 cm long; blades oblanceolate, firm, 15–25 cm long, 8–15 cm wide, rounded to abruptly acuminate, very sparsely

⁴ *Pouteria leptopedicellata* Pilz, sp. nov. *Arbor* 20 m alta. *Folia* cum petioli 2–3 cm longi; laminae oblanceolatae, firmae, 15–25 cm longae, 8–15 cm latae, apice rotundata vel abrupte acuminata, glabriuscula; costae 9–12 jugatae. *Flores* 10–20 ad axillam foliorum persistentium vel delapsorum fasciculati; pedicelli glabri, 6–10 mm longi; sepala 4, ovata, 2–3 mm longa, glabra; corolla 4 mm longa; lobi 4; tubo 2–3-plo longiores; filamenta 1–1.5 mm longa, medio tubo affixa; staminodia spathulata, 0.7 mm longa; ovarium dense rufo-pilosum, 4-loculare, cum stylo 3–4 mm longum. *Bacca* ignota.

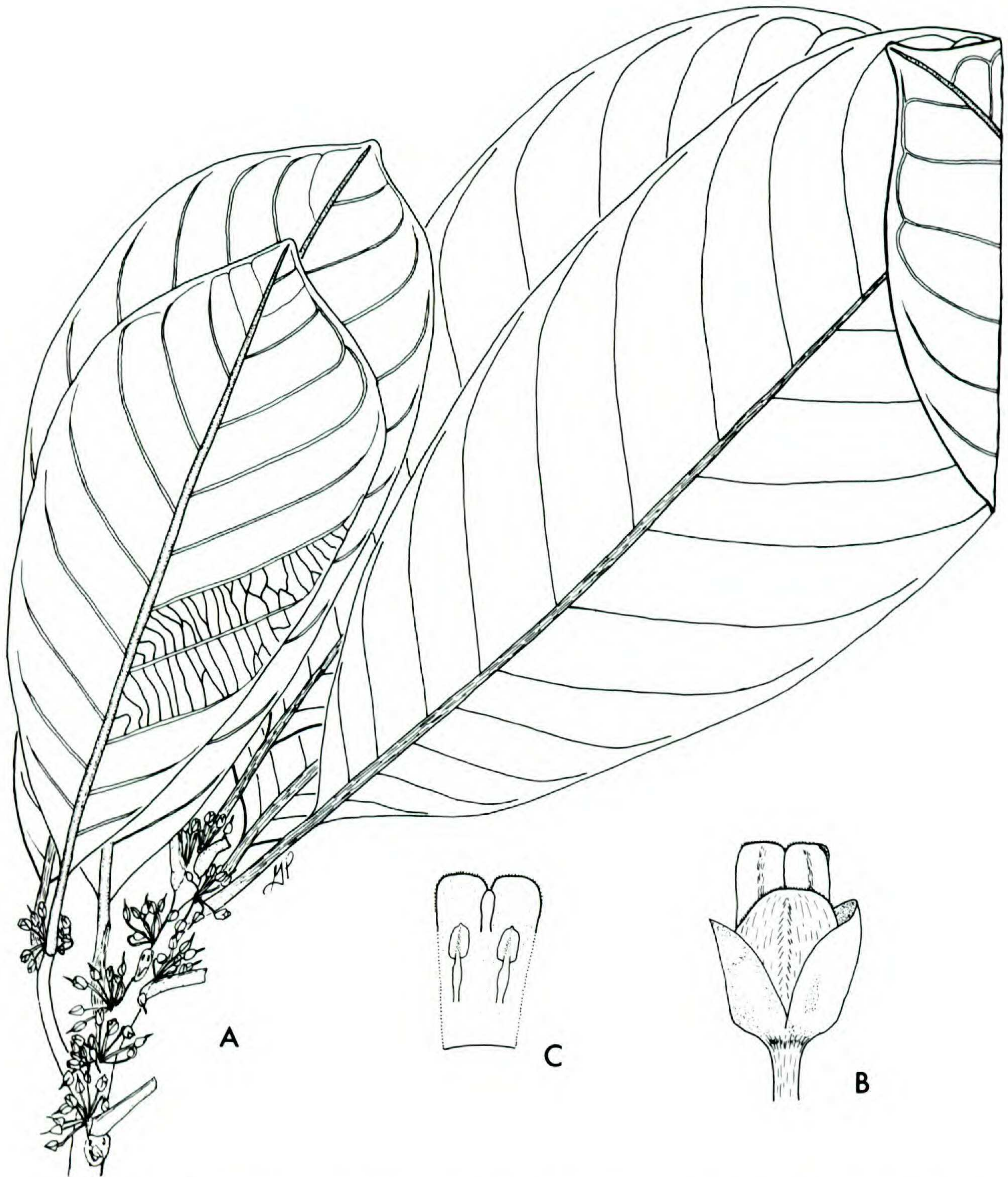


FIGURE 2. *Pouteria leptopedicellata* Pilz.—A. Habit ($\times \frac{1}{2}$).—B. Flower ($\times 5$).—C. Corolla fragment ($\times 5$). [After Mori & Kallunki 5064 (MO).]

pubescent, glabrate; primary lateral veins 9–12 pairs, the secondary and tertiary ones irregularly branching, generally perpendicular to those of the previous series. *Flowers* 10–20 in the axils or at recently defoliated nodes; pedicels 6–10 mm long, glabrous; sepals 4, ovate, 2–3 mm long, glabrous except for scattered hairs at the base of the adaxial surface; corolla 4 mm long, the 4 lobes smooth to minutely ciliolate, $\frac{1}{3}$ – $\frac{1}{2}$ as long as the tube; filaments 1–1.5 mm long, attached near the middle of the tube or below, the staminodes spatulate, 0.7 mm long; ovary densely rufous pilose, 4-loculed, the style 3–4 mm tall. *Fruit* unknown.

Pouteria leptopedicellata is closely related to *P. euryphylla* from Panama and *P. quicheana* from Guatemala; all are known only from flowering specimens of the type collections. *Pouteria euryphylla* is generally finely pale sericeous-strigose, while *P. leptopedicellata* possesses essentially glabrous sepals, pedicels, and leaves. In addition, *Pouteria leptopedicellata* possesses more flowers per node on much longer pedicels.

COLÓN: Santa Rita Ridge road 10.2 km from Boyd-Roosevelt Highway, 350 m, *Mori & Kallunki 5064* (MO).

15. ***Pouteria lucentifolia*** (Standley) Baehni, *Candollea* 9: 424. 1942.

Lucuma lucentifolia Standley, *Publ. Field Mus. Nat. Hist., Bot. Ser.* 4: 251. 1929. TYPE: Costa Rica, Talamanca Valley, *Cooper 13* (F, holotype; EAP, US, isotypes).

Tree to 11 m. *Leaves* 7–25 cm long, 3–10 cm wide, elliptic-obovate, acuminate to rarely obtuse; primary lateral veins 8–14 pairs; petioles 8–24 mm long. *Flowers* 3–7 at recently defoliated nodes; pedicels 6–8 mm long, sparsely pubescent; sepals 5, ovate, fringed ciliolate, 3–3.5 mm long, 3 mm wide, sparsely pubescent; corolla greenish white, glabrous, campanulate, 5–5.5 mm long, the lobes 5, slightly shorter than the tube; filaments 1–1.5 mm long, attached near the base of the tube, the staminodes lanceolate, 0.7 mm long, occasionally absent; ovary densely rufous pubescent at the base, otherwise glabrous, 5-loculed, the style 1.5–2 mm long. *Fruit* brown, mealy roughened even when young, fleshy, 4–6 cm long, 4–6 cm wide, 5-seeded; seed scar extending the entire length of the seed, 1.5–2 mm broad (Blackwell, 1968).

This species occurs in Honduras, Costa Rica, and Panama.

The flowers of *Pouteria lucentifolia* are described here for the first time. Only a single flowering collection (*Mori 6243*) has been made, and the complete absence of staminodes in some flowers warrants further study. *Pouteria lucentifolia* is closely related to *P. pentasperma* and shares many attributes with *P. engleri*, placed by Aubréville in the monotypic *Nemaluma*.

BOCAS DEL TORO: Changuinola Valley, *Dunlap 591* (F). Almirante, *Lao & Gentry 449* (F, MO). COCLÉ: N of El Valle de Antón, *Allen 3642* (F, K, MO, NY, US); *Lao 288* (MO). Base of Cerro Pilon above El Valle, *Gentry 3672* (MO). PANAMÁ: Below Cerro Campana, *Croat 14235* (MO). VERAGUAS: Cerro Tute, *Lao & Gentry 527* (MO, NY); *Mori 6243* (MO, NY). NW of Santa Fé, 1 km from Escuela Agrícola Alto de Piedra, *Mori & Kallunki 4814, 4883* (both MO).

16. ***Pouteria neglecta*** Cronquist, *Lloydia* 9: 286. 1946. TYPE: Belize, primary forest, Temash River, *Schipp 1354* (MICH, holotype, not seen; F, MO, NY, isotypes).

Tree to 20 m. *Leaves* with petioles 1–4 cm long; blades broadly oblanceolate to obovate, firm, acuminate, 10–50 cm long, 4–16 cm wide, glabrous above, rufous hirsute particularly along the midrib and main veins beneath, glabrate; primary lateral veins 20–35 pairs, veins prominent and conspicuous beneath, the secondary laterals essentially perpendicular to and connecting the primary laterals, distinctly more prominent than the close reticulum. *Flowers* clustered at recently defoliated nodes, subsessile; sepals 4, the outer suborbicular and enclosing the obovate inner sepals, 7–9 mm long, pubescent; corolla greenish white, glabrous,

cylindric, 6–9 mm long, the lobes 4, ovate, $\frac{1}{3}$ to equal the length of the tube; filaments 3–5 mm long, attached near the base of the tube, the staminodes linear-cylindric to subulate, 1.5–3 mm long; ovary rufous pubescent, 4-loculed, the style 2.5–8 mm long. *Fruit* to 5 cm long, subglobose, gall-like, covered with 1–2 cm long hairy processes; seeds 1–2, ovoid to subspherical, 2–3 cm long, 1.3–1.6 cm wide, the seed scar covering ca. $\frac{1}{2}$ the seed surface, extending the entire length of the seed, 8 mm broad.

This species ranges from Guatemala to Panama and perhaps Peru.

The circumscription of *Pouteria neglecta* has been enlarged from that originally proposed by Cronquist in order to accommodate Panamanian material, particularly collections from Darién. In many respects Panamanian material approaches the Peruvian *P. wurdackii* Aubréville (*Adansonia* 5: 201. 1965), with its larger corolla, proportionally longer tube and longer style. As more material is collected, it may be possible to determine the variability of the Peruvian material and to decide whether it is conspecific to *P. neglecta*.

CANAL ZONE: Pipeline road, *Croat 16619* (MO, NY); *Lao et al. 11* (F, MO); *Spellman et al. 533* (MO). DARIÉN: Quebrada Aguacate, *Bristan 1208* (MO). Cerro Pirre, *Bristan 1225* (MO). Río Tucutí near Tucutí, *Duke 5253* (MO). Río Pirre, Dos Bocas, *Foster & Augspurger 2841* (MO). Cerro Pirre base-camp on Río Parasenico, *Gentry 4770*, *Gentry & Clewell 7060* (both MO).

17. ***Pouteria pentasperma*** (Standley) Baehni, *Candollea* 9: 353. 1942.

Lucuma pentasperma Standley, *Publ. Field Mus. Nat. Hist., Bot. Ser.* 4: 251. 1929. TYPE: Panama, *Cooper 369* (F, holotype; K, NY, US, isotypes).

Tree to 15 m. *Leaves* with petioles 15–35 mm long; blades elliptic to obovate, firm, acute to obtuse, often short-acuminate, 10–25 cm long, 4–8 cm wide, very sparsely rufous pubescent, soon glabrate; primary lateral veins 12–18 pairs, the secondary and tertiary ones irregularly anastomosing. *Flowers* 4–6 in the axils and at recently defoliated nodes; pedicels 5–7 mm long; sepals (4–)5, ovate, 2 mm long, 2 mm wide, pale pubescent on the abaxial surface, particularly so near the base, the margins thin, undulate; other flower parts unknown. *Fruit* brown to golden brown, to 5 cm long, subglobose, smooth to low-tuberculate; seeds 5, 17–25 mm long, 9–12 mm wide, 4–7 mm thick, the seed scar 1.5–2 mm broad, extending $\frac{4}{5}$ to the entire length of the seed.

This species is known only from Panama.

Cronquist (1946) and Blackwell (1968) considered *Pouteria pentasperma* to be a taxonomic synonym of *P. lucentifolia*. The leaves and seeds look quite similar, but the fruit of *P. pentasperma* is smooth at maturity while that of *P. lucentifolia* is mealy roughened even when very young. The nature of the fruit of these taxa is sufficiently constant to warrant specific separation, at least until the flowers of *P. pentasperma* are known.

BOCAS DEL TORO: Almirante region, *Cooper 369* (F, K, NY, US). DARIÉN: Río Congo, *Holdridge 6279* (MO). Santa Fé, Cuipo Forest Site 2, *Duke 14295* (MO). 3 mi N of Santa Fé, *Tyson et al. 4630* (MO). 2 mi E of Santa Fé, *Tyson et al. 4839* (MO). PROVINCE UNKNOWN: Mixed label, *Duke 12552* (MO).

18. ***Pouteria sambuensis*** (Pittier) Baehni, *Candollea* 9: 250. 1942.

Lucuma sambuensis Pittier, Contr. U.S. Natl. Herb. 18: 167. 1916. TYPE: Panama, *Pittier 5621* (US, holotype; F, isotype).

Tree 10 m tall. *Leaves* 18–25 cm long, 5–9 cm wide, oblanceolate to obovate, acuminate; primary lateral veins 13–15 pairs; petioles 1–1.5 cm long. *Flowers* subsessile; sepals 4; other flower parts unknown. *Fruit* fleshy, 5 cm long, 4 cm wide, densely rusty puberulous, several-seeded; seed scar unknown (Blackwell, 1968).

Known only from the type collection.

DARIÉN: Foothills of the Garagara Mts., Sambu Valley, *Pittier 5621* (F, US).

19. *Pouteria sapota* (Jacq.) Moore & Stearn, Taxon 16: 383. 1967.

Sideroxylum sapota Jacq., Enum. Pl. Carib. 15. 1760. TYPE: *pl. 218*, H. Sloane, The Natural History of Jamaica. Vol. 2. 1725.

Calocarpum sapota (Jacq.) Merrill, Enum. Philipp. Fl. Pl. 3: 284. 1923.

Tree to 30 m. *Leaves* 10–60 cm long, 4–15 cm wide, oblanceolate to obovate, usually acuminate; primary lateral veins 20–50 pairs; petioles 1–4.5 cm long. *Flowers* clustered at recently defoliated nodes, subsessile; sepals 8–12, 2–6 mm long; corolla 6–10 mm long, the lobes (4–)5, about as long as the tube; filaments attached at the level of the sinuses; ovary 5-loculed. *Fruit* brown, fleshy, 8–20 cm long, 5–12 cm wide, 1-seeded; seed scar extending the entire length of the seed, 2–2.5 cm broad (Blackwell, 1968).

This species ranges from Mexico and the West Indies to northern South America. It is widely cultivated, and many collections represent introduced plants.

CANAL ZONE: NW edge of Gamboa, *Mori & Kallunki 4723* (MO). W of Gamboa, *Nee 9474* (MO). ½–1 mi below Chilibre, *Seibert 1517* (MO, US). Balboa, *Standley 26080* (US). CHIRIQUÍ: Santa Clara region, 27 km NW of El Hato del Volcán, *Mori & Bolten 7214* (MO). Banks of Río Tabasará, *Woodson et al. 441* (MO). COCLÉ: Olá, *Pittier 5089* (NY, US). DARIÉN: El Real, *Correa & Lazor 1569* (MO). HERRERA: Las Minas to Pesé, *Duke 12307* (MO). PANAMÁ: Arraiján, *Lao 108* (MO). Laguna de Portala, Chepo, *Pittier 4628* (US). Tabago Island, *Standley 27916* (US). SAN BLAS: Between Río Diablo and Río Acuati, *Duke 14904* (MO). Ailigandí, *Dwyer 6849* (MO). Mainland opposite Playon Chico, *Gentry 6395* (MO). Mainland opposite Ailigandí, from mouth of Ailigandí River to 2.5 mi inland, *Lewis et al. 163* (MO, UC, US).

20. *Pouteria sclerocarpa* (Pittier) Cronquist, Lloydia 9: 287. 1946.

Lucuma sclerocarpa Pittier, Contr. U.S. Natl. Herb. 18: 166. 1916. TYPE: Panama, *Pittier 4357* (US, holotype; F, MO, NY, isotypes).

Calocarpum sclerocarpum (Pittier) Lundell, Wrightia 5: 253. 1976.

Tree 25 m. *Leaves* 10–25 cm long, 4–8 cm wide, elliptic-obovate, acuminate; primary lateral veins 13–20 pairs; petioles 1–2.2 cm long. *Flowers* several per axil, subsessile; sepals 6–7, to 6.5 mm long; corolla 6–8 mm long, the lobes 5, about ½ as long as the tube; filaments attached at the level of the sinuses; ovary 5-loculed. *Fruit* yellow, sclerous, 5–7.5 cm long, 3–4.5 cm wide, 1-seeded; seed scar extending the entire length of the seed, ca. 2 cm wide (Blackwell, 1968).

This species is known definitely only from the type collection. Two collections from Darién (*Duke 8593* and *Bristan 1294*, both MO) are only tentatively determined to be this species.

SAN BLAS: Plain of Sperdi, near Puerto Obaldía, *Pittier 4357* (F, MO, NY, US).

21. ***Pouteria stipitata*** Cronquist, *Lloydia* 9: 265. 1946. TYPE: Panama, *Zetek 4693* (F, holotype; EAP, MO, isotypes).

Tree to 20 m. *Leaves* 6–13 cm long, 2–4.5 cm wide, elliptic to narrowly obovate, acuminate; primary lateral veins 7–11 pairs; petioles 4–17 mm long. *Flowers* clustered at the defoliated nodes, occasionally heteromorphic and unisexual; pedicels 3–8 mm long; sepals 4–5, 2–2.5 mm long; corolla 2.3–3.2 mm long, the lobes 4, ca. ½ as long as the tube; filaments attached at the middle of the corolla tube; ovary 4-loculed. *Fruit* yellow, flesh scanty, 2–3.5 cm long, 1.5–2 cm wide, constricted to a stipe ca. 7 mm long and 3 mm thick, 1-seeded; seed scar extending the entire length of the seed, 8–10 mm broad (Blackwell, 1968).

This species is known only from Panama. Most collections are from Barro Colorado Island and the Perlas Archipelago.

Pouteria stipitata is most likely related to four species from Brazil and northern South America that are placed by Aubréville in *Pseudolabatia*.

CANAL ZONE: Barro Colorado Island, *Croat 10291* (F, MO, NY), *10293* (F, MO, UC); *Shattuck 1125* (F, MO); *Zetek 4693* (EAP, F, MO). DARIÉN: Chepigana, *Terry & Terry 1504* (F, MO), only a tentative identification. PANAMÁ: San José Island, *Erlanson 324* (US); *Johnston 634* (MO, NY, US). El Llano to Cartí-Tupile road, 12 mi above Panamerican Highway, *Liesner 1220* (MO).

22. ***Pouteria stylosa*** (Pierre) Dubard in Lecomte, *Not. Syst.* 1: 381. 1911.

Guapeba stylosa Pierre, *Not. Bot. Sapot.* 42. 1891. TYPE: Panama, *Sutton-Hayes 67* (not seen). *Neolabatia stylosa* (Pierre) Aubréville, *Mem. New York Bot. Gard.* 23: 203. 1972.

Tree to 7 m. *Leaves* 7–20 cm long, 2.5–7 cm wide, elliptic to narrowly obovate, acuminate; primary lateral veins 10–20 pairs; petioles 3–10 mm long. *Flowers* clustered in the axils or at recently defoliated nodes, sessile to subsessile; sepals 4, 2.5–4 mm long; corolla 2.5–4 mm long, the lobes 4, ½ as long as the tube; filaments attached near the base of the tube; ovary 4(–6)-loculed. *Fruit* woody, ca. 3 cm long, 3.5 cm wide, 2-seeded; seed scar nearly extending over the entire surface except for an elliptical area ca. 5 mm wide (Blackwell, 1968).

This species occurs in Panama, and perhaps from Honduras to Colombia.

BOCAS DEL TORO: Almirante region, Konkintoe, 10 mi above Holstein, *Cooper 509* (F). CANAL ZONE: W of Limón Bay, Gatún Locks and Gatún Lake, *Johnston 1820* (MO). Mamei Hill, *Pittier 3807* (F, NY, US). Hills near Gatún, *Standley 27193* (MO, US). Obispo, *Standley 31684* (US). PANAMÁ: El Cermeño, *Allen 2572* (F, NY); *Zetek 4804* (F, MO). Chiltepe, *Holdridge 6466* (MO). Vista Alegre, Río Aguacate, 2 mi beyond Arraiján, *Lao 589* (MO); *Zetek 5511* (EAP, F, MO, US).

23. ***Pouteria subrotata*** Cronquist, *Lloydia* 9: 277. 1946. TYPE: Panama, *Pittier 6548* (US).

Tree to 15 m. *Leaves* 10–23 cm long, 5–12 cm wide, obovate, acuminate; primary lateral veins 8–11 pairs; petioles 1.5–3 cm. *Flowers* several in the axils of the leaves and at recently defoliated nodes, subsessile; sepals 5, 1.7–2 mm long; corolla 3.5–3.8 mm long, the lobes 5, twice as long as the tube; filaments attached at the level of the sinuses; ovary 5-loculed. *Fruit* yellow green, turning red, 2–2.5 cm long, 1–1.3 cm wide, the flesh scant, 1-seeded; seed scar extending the entire length, 8–9 mm broad (Blackwell, 1968).

This species occurs in Panama and southeastern Costa Rica.

Pouteria subrotata is evidently related to species placed by Aubréville in *Richardella* Pierre.

COLÓN: East Ridge, *Duke 15265* (MO). DARIÉN: Río Ucurgantí, *Bristan 1122, 1177* (both MO). La Boca de Pirre, *Bristan 1273* (MO). 1–4 mi N of Pucro, *Duke 13003* (MO). Río Paya, *Duke & Kirkbride 14073* (MO, NY). Pinogana, *Pittier 6548* (US).

24. *Pouteria tarapotensis* (Eichl. ex Pierre) Baehni, Candollea 9: 273. 1942.

Lucuma tarapotensis Eichl. ex Pierre, Not. Bot. Sapot. 24. 1890. TYPE: Peru, near Tarapoto, *Spruce 4561* (F, K, NY, P, isotypes).

Franchetella tarapotensis (Eichl. ex Pierre) Pierre, Not. Bot. Sapot. 24. 1890; Aubréville, *Adansonia*, n.s., 1: 183. 1961.

Tree to 15 m. *Leaves* with petioles 15–25 mm long; blades elliptic, firm, narrowly acuminate, 13–18 cm long, 4–7 cm wide, densely pale sericeous beneath, sparsely pubescent above; primary lateral veins 9–14 pairs, not becoming crowded near the base, the secondary laterals rather irregular and sinuous, perpendicular to the primary series only near the margin. *Flowers* 12–20 in the axils or at recently defoliated nodes; pedicels 3–5 mm long at anthesis; sepals 5, ovate, 1 mm long, 1 mm wide, densely pubescent; corolla glabrous, 2–2.5 mm long, the lobes 5, ovate, rounded, fringed-ciliolate, as long as the tube; filaments 0.5 mm long, attached at the level of the sinuses, the staminodes triangular-lanceolate, often ciliolate, 0.7–1 mm long; ovary densely pubescent, 0.7 mm high, 1-loculed, the style 0.7 mm long. *Fruit* unknown in Panama, in Peru brown-pilose, oliviform, 20–25 mm long, 7–9 mm wide, 1-seeded; seed scar completely covering the compressed adaxial face.

This species occurs in Peru, Brazil, and Panama.

The identity of the specimen is problematic. Typical *Pouteria tarapotensis* differs from the Panamanian material described above in possessing generally shorter petioles, 5–7 mm long, smaller obovate leaves, 9–16 × 3–7 cm, fewer flowers per axil, 5–8, and much shorter pedicels, to 1 mm long. Fruits from Panama have not been collected, and when better known, these plants may prove to represent a distinct species.

PANAMÁ: 6 km above Panamerican Highway on road from El Llano to Cartí-Tupile, *Kennedy 1805* (MO).

25. *Pouteria unilocularis* (Donn. Smith) Baehni, Candollea 9: 273. 1942.

Sideroxylon uniloculare Donn. Smith, Bot. Gaz. (Crawfordsville) 35: 5. 1903. TYPE: Costa Rica, Tucurrique, Río de las Vueltas, *Tonduz 13358* (F, K, isotypes).

Franchetella unilocularis (Donn. Smith) Aubréville, *Adansonia*, n.s., 3: 21. 1963.

Tree to 20 m. *Leaves* with petioles 7–10 mm long; blades elliptic, firm, acuminate, 7–14(–20) cm long, 3–7(–9) cm wide, glabrous; primary lateral veins 12–14 pairs, the secondary and tertiary ones closely reticulate. *Flowers* 5–10 in the axils or at recently defoliated nodes; pedicels 3–7 mm long; sepals (4–)5(–6), ovate, 1.4–1.7 mm long, ca. 1 mm wide, sparsely rufous pubescent; corolla white, glabrous, 2.2–2.7 mm long, the lobes (4–)5, fringed-ciliolate, about twice as long as the tube; filaments to 0.5 mm long, attached at the level of the sinuses or slightly below, the staminodes triangular-lanceolate, often petaloid, 0.7–1 mm long; ovary sparsely pubescent, 1-loculed, the style 0.5 mm long. *Fruit* yellow, obovoid to subglobose, 1.5–2 cm long; seeds solitary, to 14 mm long, 8 mm wide, ellipsoidal, the seed scar extending the entire length of the seed, 3–5 mm wide.

This species occurs in Mexico, Belize, Guatemala, Honduras, Costa Rica, and Panama.

Pouteria unilocularis is evidently closely related to *P. tarapotensis*, but it can be readily distinguished by its essentially glabrous leaves.

CANAL ZONE: Barro Colorado Island, *Croat 10971, 17052* (both MO); *Croat 14874* (MO, NY); *Zetek 5148* (EAP, F, MO). CHIRIQUÍ: Gualaca to Fortuna dam site, NW of Los Planes de Hornito, *Croat 49844* (MO). DARIÉN: Río Ucurgantí, *Bristan 1184* (MO, NY).

11. SYNSEPALUM

Synsepalum (A. DC.) Daniell in Bell, Pharm. J. Trans. 11: 445. 1852. TYPE: *S. dulcificum* (Schum. & Thonn.) Daniell.

Shrubs or small trees lacking spines. *Leaves* alternate, exstipulate; blades firm, the lateral veins generally few. *Flowers* sessile or short-pedicellate; sepals 5, uniseriate, united for more than half their length; corolla lobes 5, lacking appendages; stamens epipetalous, the filaments attached at the level of the sinuses, the staminodes alternating with the stamens, petaloid; ovary 5-loculed. *Fruit* baccate; seeds solitary, the seed scar lateral, very broad, covering about half the seed, the endosperm absent, the cotyledons fleshy.

Synsepalum is a tropical African genus of about 8 species.

1. **Synsepalum dulcificum** (Schum. & Thonn.) Daniell in Bell, Pharm. J. Trans. 11: 445. 1852.

Bumelia dulcifica Schum. & Thonn. in Beskr. Guin. Pl. 130. 1827. TYPE: not seen.

Shrub or small tree to 3 m. *Leaves* with petioles 2–5 mm long; blades elliptic to obovate, firm, obtuse or mucronate (emarginate), 5–10 cm long, 2–5 cm wide, glabrescent; primary lateral veins 8–13 pairs, the secondary and tertiary ones irregularly anastomosing, raised above, obscure below. *Flowers* 1–5(–10) in the axils or at recently defoliated nodes; pedicels to 2 mm long, rufous tomentose; calyx 3–5 mm long, the 5 lobes short, triangular, rufous pubescent; corolla glabrous, 5–7 mm long, the 5 lobes entire, about as long as the tube; filaments attached at the level of the sinuses, the staminodes erose, ovate, 2 mm long; ovary pubescent, 5-loculed, the style 5–10 mm long. *Fruit* red purple at maturity, ovoid, 1.6–2 cm long; seeds solitary, ovoid, 1.2–1.5 cm long, the seed scar lateral, very broad, covering about half the seed and extending the entire length.

This species occurs in west and central Africa from Ghana, Benin, southern Nigeria, Cameroun, to Zaire. It is widely cultivated in the tropics.

The fruits of the "Miracle Berry," when eaten, have the peculiar property of making anything eaten within 2 or 3 hours afterwards taste sweet, even very acid substances like sour limes (Nigerian Trees 2: 363. 1964).

CANAL ZONE: Summit Gardens, *Gentry 4997* (MO); *Steyermark* (MO).